Scala
Scientific

USER'S MANUAL

Ultra low temperature freezers

Upright & Chest

Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel and poor equipment performance

0. QUICK INSTALLATION GUIDE

After installation on location leave the freeze to rest for at least 8 hours

1. Recommended room conditions

A. RECOMMENDED ROOM TEMPERATURE: BETWEEN 5 ºC AND 28 ºC;

*If the room temperature is normally > 30 ºC please install suitable air-conditioning.

b. Make sure the floor is level and even;

c. Make sure the condenser grid is not blocked (adequate air circulation is required);

d. Install the two spacers on the back of the freezer to allow heat dispersion behind the freezer; *fig.1*

.1

2. Turning the Freezer on

WARNING

=> Always start-up the freezer empty!

Do not put racks inside the freezer before it has reached his set point.

a. Push the power plug firmly into the power socket (please check you have the correct voltage); *fig.2*

Fig.2

WARNING

It should be connected to a suitable socket base (minimum 15A) with a grounded plug. The plug connection must be located in such a place to prevent it from being unplugged accidentally during operation, e.g., next to a wall or closed to another equipment.

b. Once the above points have been controlled, start up the ultrafreezer by pressing the On/Off button (Chapter 5.1). After entering the password correctly (by default the password is **0000**) or immediately if password has been disabled,

3. Recommended set points

a. set-point – 80 ºC

b. cold alarm – 83 ºC

c. warm alarm – 76 ºC

These set points are factory set and gives the freezer the optimum conditions for prolonged life.

4. Recommended maintenance

a. We recommend the condenser filter is cleared of dust every month;

b. We recommend that ice is removed from the door seals every month;

c. We recommend a maintenance visit by your local dealer on an annual basis.

We wish you a quick and trouble free installation!

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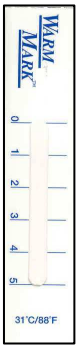
1. WARRANTY NOTICE



IMPORTANT: WARRANTY AND ROOM TEMPERATURE

This unit is equipped with automatic monitoring of ambient temperature alarm:

1. In case this WarmMark is removed from the product, warranty will be terminated.
2. In case the room temperature climbs above +33 ºC for a long period of time, a red colour gradually moves through the window of the WarmMark Indicator. Every window which is indicated red will decrease warranty period with 1 year.

2. SYMBOLS AND ABBREVIATIONS

Abbreviations used in this manual

V	Volts	h	hours
A	Amperes	Hz	Hertz
W, kW	Watts, kilowatts	dB	Decibel
mm, cm, m	Millimetres, centimetres, metres	ºC	Celsius
kg	Kilogram	ULT	Ultra Low Temperature Freezer

3. GENERAL DATA

WARNING

This Manual must be read and understood before its installation, maintenance and operation of the equipment. All the safety instructions given in the Manual must be followed.

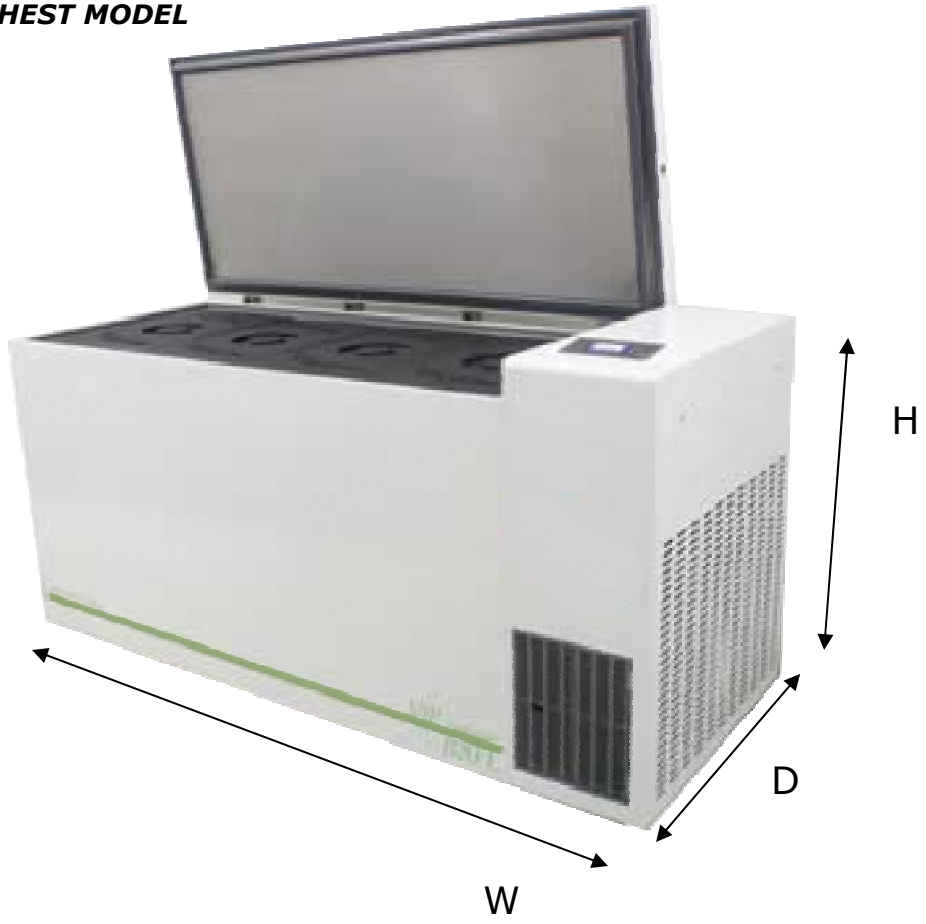
Any use or application failing to comply with the recommendations expressed in the Manual may cause danger and loss of rights to manufacturing guarantee as well as freeing the manufacturer from all responsibility arising.

All maintenance actions on this equipment must be performed by a qualified technician who is familiar with the proper maintenance procedure required for this equipment. In case these actions are not carefully carried out, as a result the equipment can work in abnormal conditions.

4. DESCRIPTION OF THE ULTRAFREEZERS

4.1. DIMENSIONS

4.1.1. CHEST MODEL



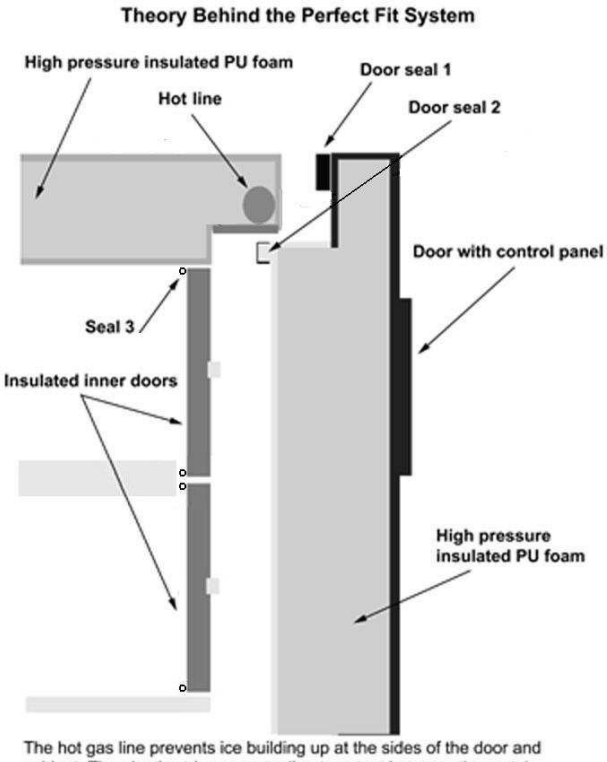
Model No.	Exterior Dimensions W x D x H	Interior Dimensions W x D x H	Capacity (L)
C370	1267x872x1073mm	725x660x784 mm	370
C620	1747x872x1073mm	1200x660x784 mm	620
C820	2147x872x1073mm	1600x660x784 mm	820

4.1.2. UPRIGHT MODEL

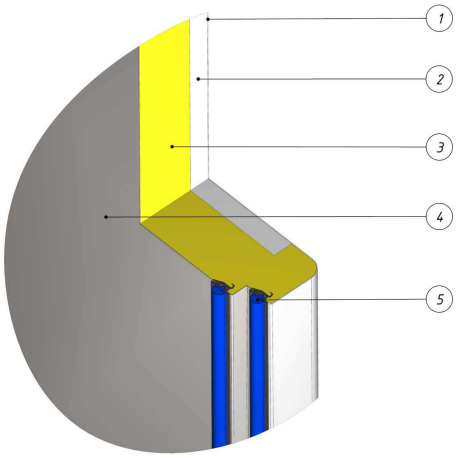
Model No.	Exterior Dimensions W x D x H	Interior Dimensions W x D x H	Capacity (L)
U445	705x901x1991mm	490x606x1500mm	445
U570	845x901x1991mm	630x606x1500mm	570
U830	1135x901x1991mm	920x606x1500mm	830

4.2. SPECIFICATIONS

1. Hermetically sealed cooling system with very durable compressors
2. Cold air loss is minimized by insulated inner doors
3. Efficient evaporator with maximum contact with walls for fast cooling down
4. 80 mm polyurethane foamed insulation
5. Heavy-duty casters with built in adjustable stands
6. Cabinet with round corners for easy cleaning
7. 2 Built-in access ports
8. Very user-friendly control panel at eye level
9. Easy to clean condenser filter
10. Pressure equalization port allows easy access to cabinet after door closing
11. Quiet running fans and compressors create a very low noise level (<50 dBa)
12. Heated door seals prevent ice to build up



The hot gas line prevents ice building up at the sides of the door and cabinet. The plastic strip prevents direct contact between the metal cabinet housing and the door / air. Direct cold conduction (ice) is prevented. Insulated inner doors prevent cold loss from the individual compartments. The unique 3-door-seal-system ensures a tight door closing with as result a minimum of ice.



VIP insulation of Igloo:

1. Polyester coated exterior
2. Vacuum insulation
3. PU foam
4. Stainless steel interior
5. Double door seal (heated)

4.2.1. CHEST MODEL SPECIFICATIONS

TECHNICAL SPECS	UNIT	Igloo C370	Igloo C620	Igloo C820
Cabinet material	internal	full 304 stainless steel interior		
	external	Polyester coated exterior		
Sample throughputs		2 standard ports (+ 1 pre-cut)		
Weight (uncrated/crated)	Kg	180/200	220/250	285/325
Electricity	V / Hz	220-240 V, 50 Hz		
TEMPERATURE SPECS	**UNIT**	**Igloo C360**	**Igloo C620**	**Igloo C820**
Temperature range	ºC	up to -86 (factory set point is -80)		

We recommend running the -86 Igloo CXXX Series with a set point of -80°. Our freezers are produced, tested and calibrated on this temperature set point. With this set point the freezer is performing in most optimal conditions and guarantees the longest lifetime for compressors. In case of using set points with colder temperature will decrease compressor lifetime and does not have any effect on better conditions for your samples.

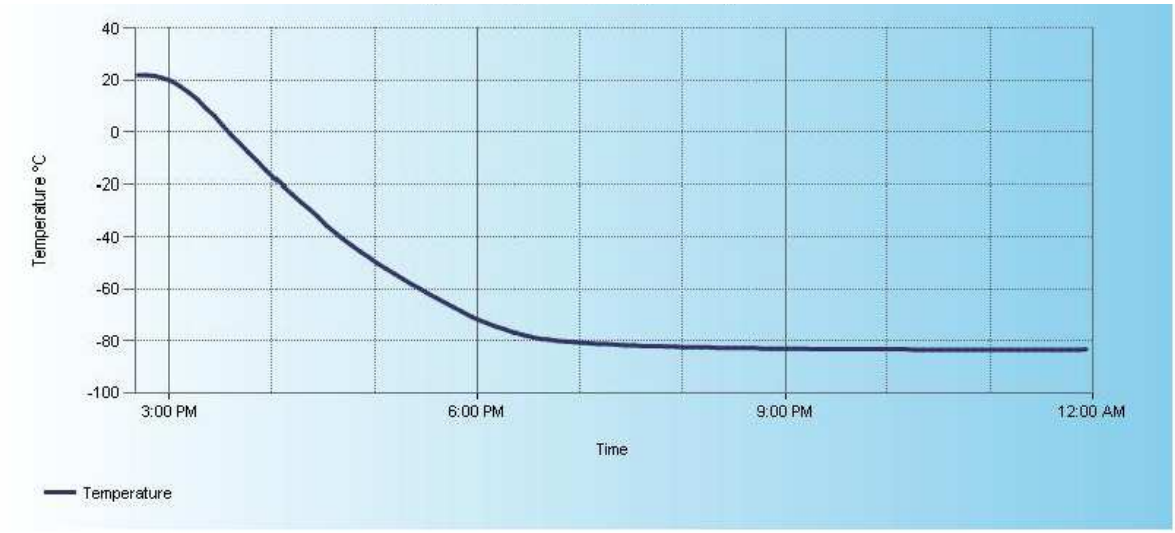
4.2.2. UPRIGHT MODEL SPECIFICATIONS

TECHNICAL SPECS	UNIT	Igloo U445	Igloo U570	Igloo U830
Cabinet material	internal	full 304 stainless steel interior		
	external	Polyester coated exterior		
Sample throughputs		2 standard ports (+ 2 pre-cut)		
Shelves, inner doors		standard 5 inner doors, 4 shelves		
Weight (uncrated/crated)	Kg	270/302	293/328	352/392
Electricity	V / Hz	220-240 V, 50 Hz		
TEMPERATURE SPECS	**UNIT**	**Igloo U445**	**Igloo U570**	**Igloo U830**
Temperature range	ºC	up to -86 (factory set point is -80)		

We recommend running the -86 Igloo UXXX Series with a set point of -80°. Our freezers are produced, tested and calibrated on this temperature set point. With this set point the freezer is performing in most optimal conditions and guarantees the longest lifetime for compressors. In case of using set points with colder temperature will decrease compressor lifetime and does not have any effect on better conditions for your samples.

4.2.3. CHARACTERISTICS OF TEMPERATURE U445 SERIES

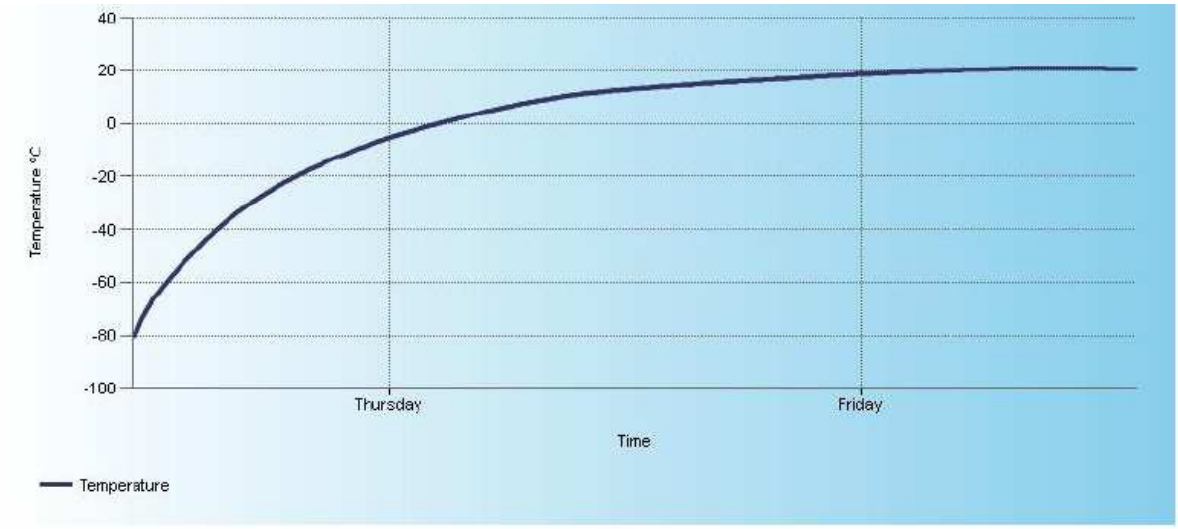
Pull down curve for U445 (for testing cooling speed)



Testing environment:
Ambient temperature: +25°C (+/- 2 °C)
Empty freezer

Powered by:
Wireless Lab®
www.wirelesslab.eu

Warm up curve for U445 (for testing isolation rate)



Testing environment:
Ambient temperature: +25°C (+/- 2 °C)
Empty freezer

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Wireless Lab®
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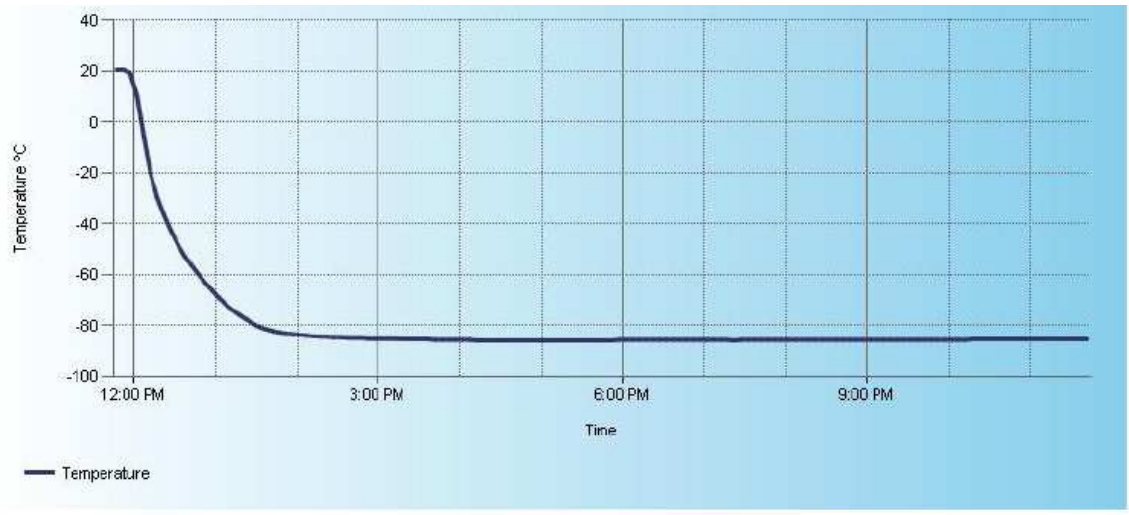
4.2.4. CHARACTERISTICS OF TEMPERATURE C370 SERIES

Pull down curve for C370 (for testing cooling speed)

Model: C370 Temperature Pull Down



Testing environment:
Ambient temperature: +25°C (+/- 2 °C)
Empty freezer

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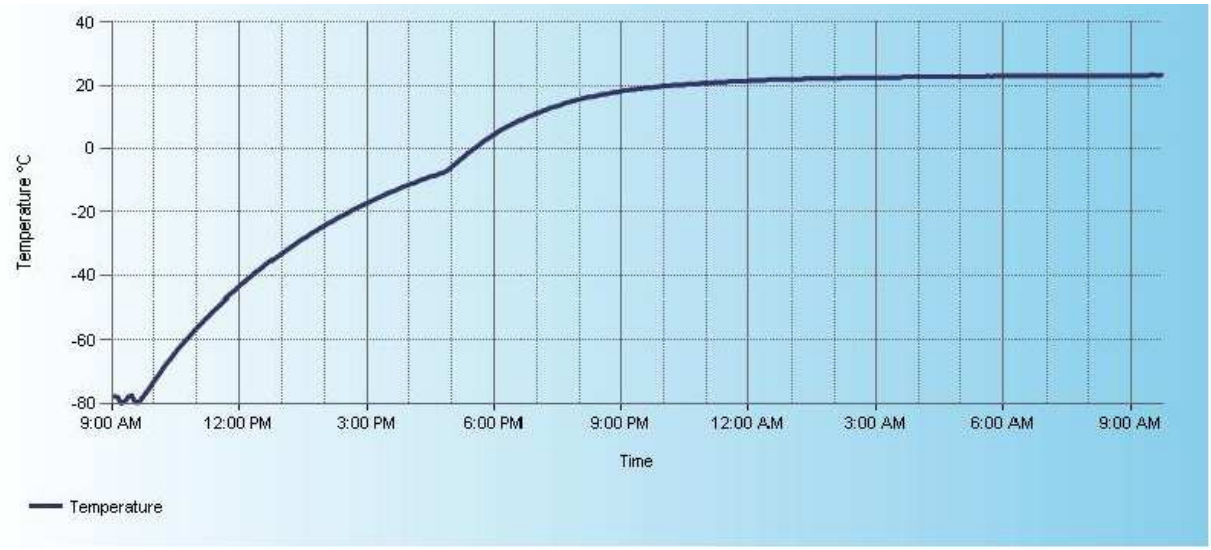
Warm up curve for C370 (for testing isolation rate)

Model: C370 Temperature Warm Up



Testing environment:
Ambient temperature: +25°C (+/- 2 °C)
Empty freezer

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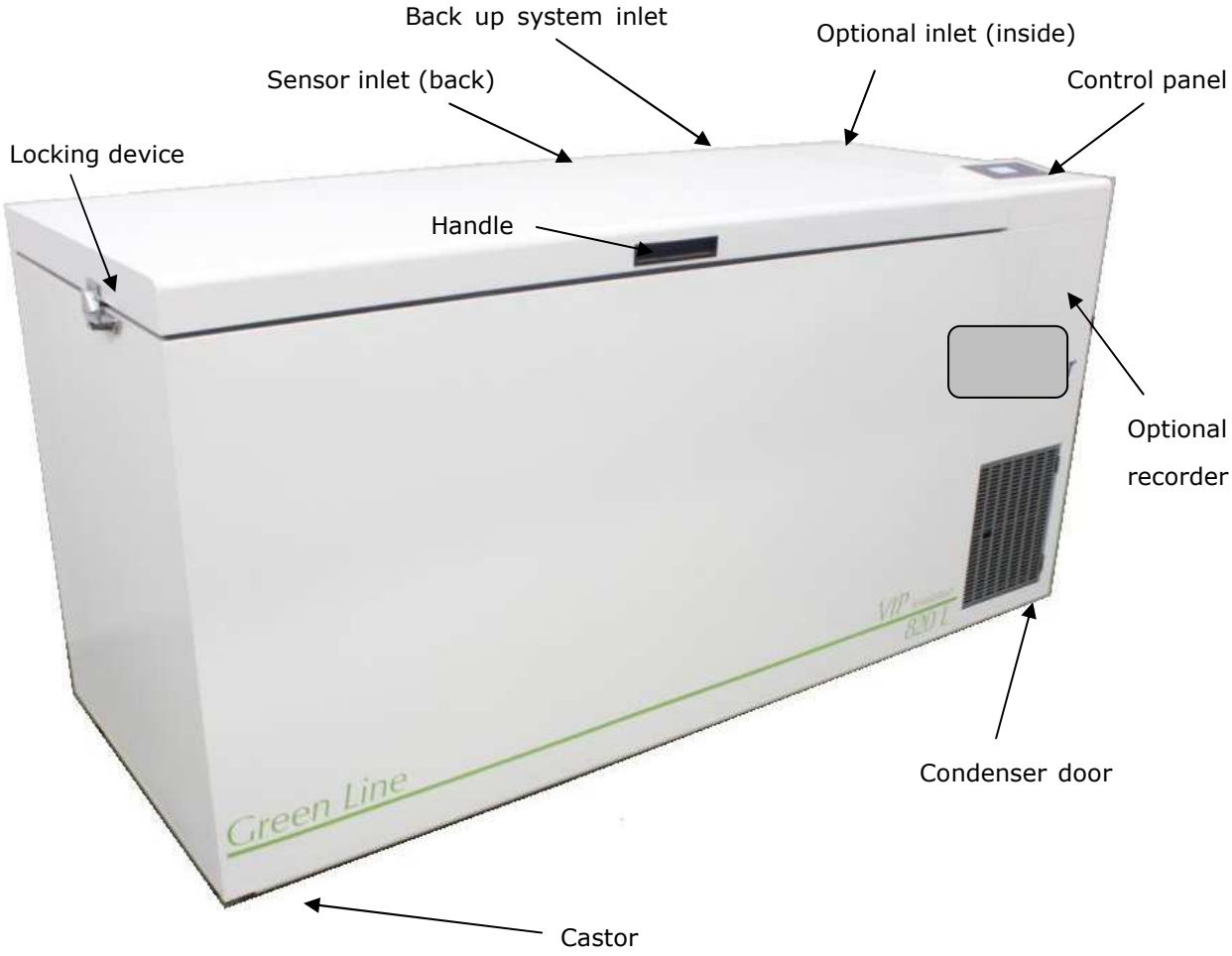
4.3. COMPONENTS & FUNCTION DESCRIPTION

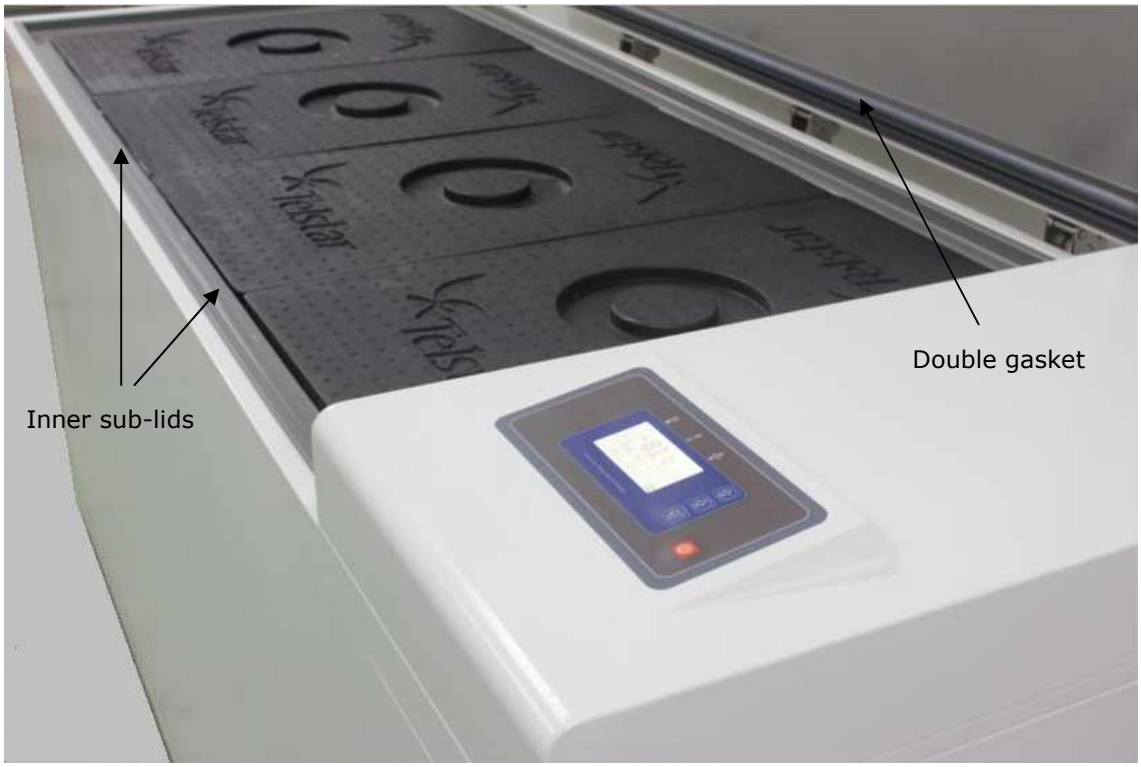
4.3.1. CHEST MODEL



4.3.2. UPRIGHT MODEL

Back up system inlet (on back + optional on top of unit)
Control panel
Sensor inlet (on back of unit)
Locking device
Optional inlet (on bottom of unit)
Optional recorder
Condenser air inlet

4.3.3. INNER SUB-LIDS FOR CHEST MODELS



Type of inner sub-lid	A	B	Model		
			Igloo C370	Igloo C620	Igloo C820
Size (mm)	372×695×25	405×695×25	A×2	B×3	B×4

4.3.4. INNER COMPARTMENT SHELVES FOR UPRIGHT MODELS

Model	Number of **trays/inner doors** as standard	Number of **trays/inner doors** as option	**Tray** size(mm) (W)×(D)×(H)
Igloo U445	4/5	1/2, 2/3, 5/6	460×583×10
Igloo U570	4/5	1/2, 2/3, 5/6	600×583×10
Igloo U830	4/5	1/2, 2/3, 5/6	890×583×10

5. INSTALLATION INSTRUCTIONS

5.1. RECOMMENDATIONS AND PRECAUTIONS

Before installing, using or maintaining this product, please be sure to read this manual carefully. Failure to follow these instructions may cause this product to malfunction, which could result in injury or damage.

This ULT freezer is designed to run at ambient temperature of 5ºC till 28ºC. This unit is a storage freezer. Freezing large quantities of water or high-water content items will temporarily increase the unit temperature and will cause the compressors to operate for a longer period of time. Using this freezer as a rapid freezer may cause damage to refrigeration system or compressors.

Avoid opening the door for longer periods of time, since cold air will go out of the chamber quickly, room air may cause frost and ice built up in the chamber and around the door.

The sub lids of the chest freezer are necessary to maintain set temperature, do not remove these sub lids or leave the freezer open without sub lids for a period of time. Upright models have HDPE inner doors as extra safety to prevent cold air getting out and warm air getting into the freezer.

Do not position the unit into direct sunlight or near a heating device.

Connect the unit to the correct power source. Incorrect voltage can result in severe damage to the equipment. Make sure this unit is properly grounded. Do not connect the unit to overloaded power lines.

5.2. PACKING/TRANSPORT

When our products leave our warehouse they have been tested thoroughly and packed with precision. At delivery, examine the packing while the forwarder is present. Check the ShockWatch in case of visible damage to packing or ShockWatches indicated red. In this case mark this on the shipping documentation while the forwarder is present and state an official complaint to the forwarding company.

If there is no visible damage to the unit, unpack inspect (and test) the equipment within 8 days of delivery. Do not return goods without notifying and authorization.

5.3. TEMPERATURE RECOMENDATIONS

We recommend running the ULT's with a set point of -80°C. Our freezers are produced, tested and calibrated on this temperature set point. With this set point the freezer is performing in most optimal conditions and guarantees the longest lifetime for compressors. In case of using set points with colder temperature will decrease compressor lifetime and does not have any effect on better conditions for your samples.

5.4. SAFETY INSTRUCTIONS

The ULT's are filled with flammable refrigerant; always take care of the following warnings:

WARNING – Keep ventilation openings in the appliance enclosure clear of obstruction

WARNING – Do not use mechanical devices or other mains to accelerate the defrosting process, other than those recommended by the manufacturer

WARNING – Do not damage the refrigeration circuit

WARNING – Do not use electrical appliances inside the storage compartments of the appliance, unless they are of the type recommended by the manufacturer

5.5. INSTALLATION PLACE

1. Do not subject to direct sunlight
2. Adequate air circulation
3. Not subject to excessive dust
4. Not subject to mechanical vibration or shock
5. Operating temperature: 5°C to 33°C, Recommended performance conditions are ambient of 18 – 22°C
6. Operating moisture: below 80%(in case that the max. operating temperature is 33°C , it should be below 57%)
7. Allowance of supplying voltage change: lower than 10%

*In case you install the unit other places than mentioned above, the unit cannot operate properly.

5.6. HOW TO INSTALL

1. Keep the distance between the wall and the backside of the unit 15cm or more (please use the standard supplied distance pins)
2. Do not install the unit in an uneven position.
3. Make the unit fixed with fixing screws on the sleepy floor.
4. The ventilation should not be obstructed.

5.7. ELECTRICAL CONNECTIONS AND SERVICE CONNECTIONS

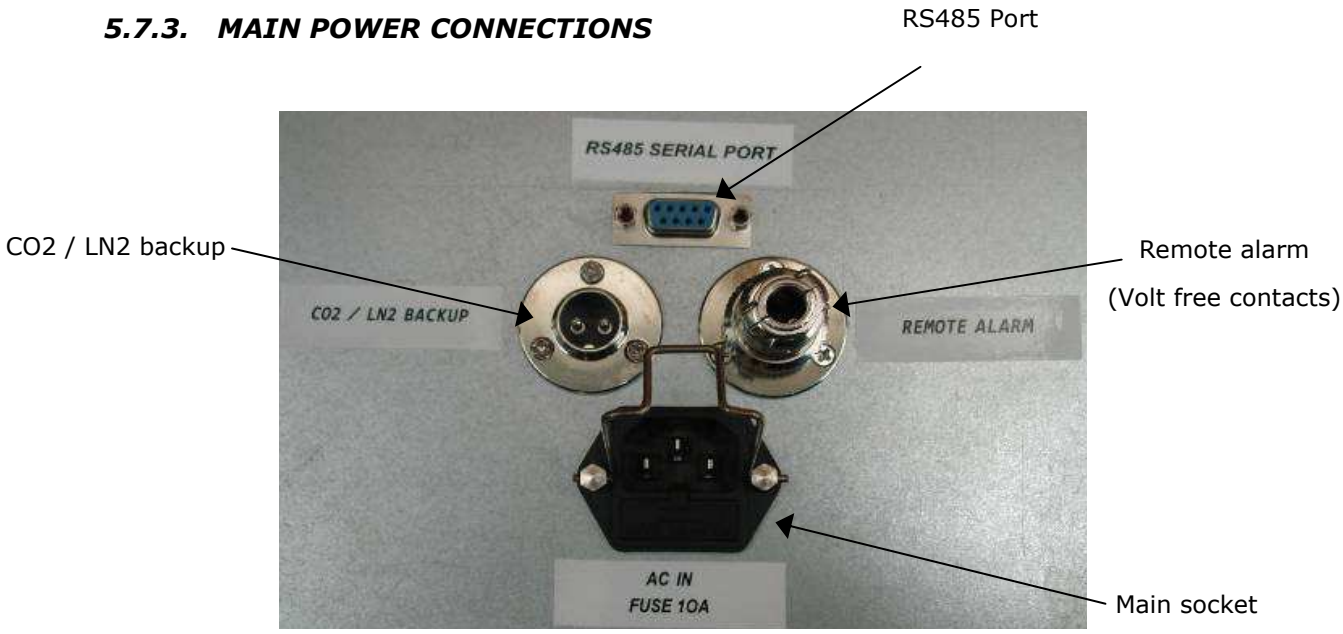
5.7.1. POWER SUPPLY

1. To ensure trouble-free connection, connect the plug firmly in the power socket.
2. Don't connect the plug of the unit together with plug of other units in the same socket.
3. Make sure that the power supplying cord is not folded and pressed.
4. If you use an extension wire, it should has capacity above 250V, 15A and not longer than 3m.
5. This unit is exclusively designed for 205-240V, 50Hz, please check the operating voltage, before use.

5.7.2. HOW TO EARTH

1. For security reasons, the unit should be earthed.
2. If the power socket is fitted with earth rod (230V), please check the outlet for earth, before use.
3. In case the power socket is **not** fitted with earth rod (230 V), please contact your local supplier.

5.7.3. MAIN POWER CONNECTIONS



When the power supply is checked and the unit is earthed, you can switch on the unit.

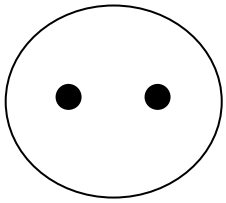
5.7.4. DOOR ALARM

The door alarm can be used in combination with the CO2 backup system. It is a safety feature to make sure the operator does not get into contact with liquid CO2 / LN2 in case of opening the door of the freezer. Always connect the CO2 / LN2 backup system to the door alarm connection at the back of the freezer.

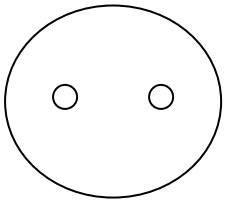
*For safety measure resistance on the contacts with Ohm metre

1. Do contact 1 & 2 show resistance?

Connection should be a closed loop



(normal conditions, closed loop)



(door open conditions, open loop)

2. Open door / lid

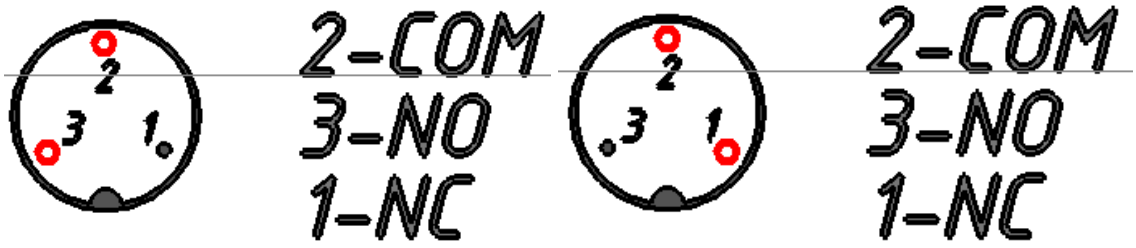
3. Do contact 1 & 2 show unlimited resistance?

Connection should be an open loop

5.7.5. REMOTE ALARM

The remote alarm is a volt free dry contact which will alarm in case of any alarm is activated.

Male and female alarm plug #603309



Normal Conditions *Alarm Conditions*

In normal conditions, the relay is always open which means connection between COM and NO (normally open). In case of alarm, the relay is closed which means connection between COM and NC (normally closed).

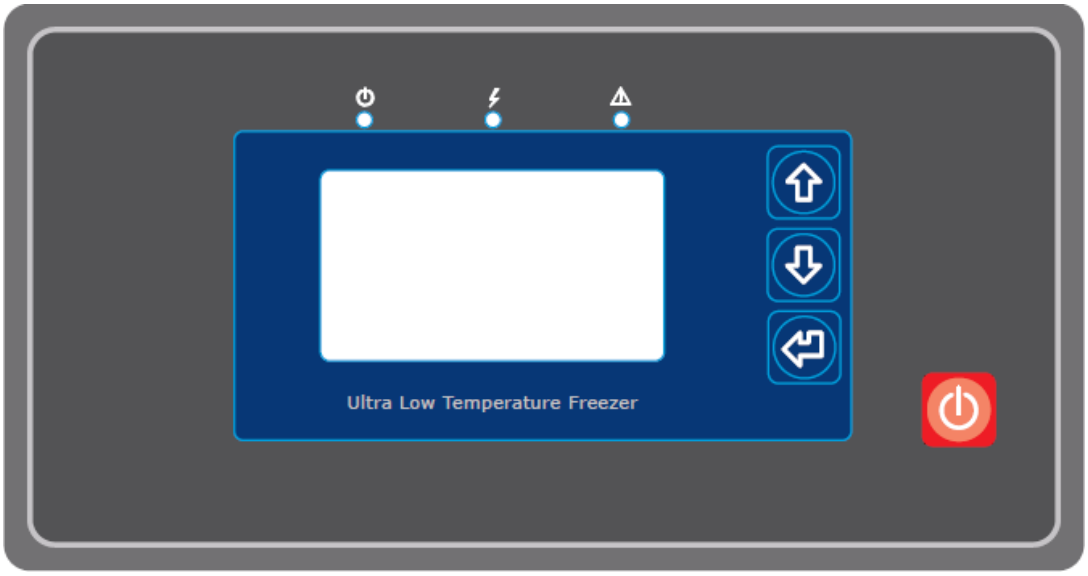
5.7.6. RS485 PORT

The RS485 Port can be used to monitor parameters and alarms on your PC by using the Scala software and a RS485 to RS232 cable with converter.

6. OPERATING INSTRUCTIONS

6.1. CONTROL KEYBOARD-DISPLAY

The following elements are found in the control keyboard**:**



A. *On/Off Button*

- Pressing when the freezer is turned off:
  It goes to the *Password Request* screen. When entering the correct password, it goes to the *Main Operation* screen.

- Pressing when the freezer is turned on:
  It goes to the *Password Request* screen. When entering the correct password, the cabinet switches off.

B. *Navigation buttons* , *and* *:*

They move the cursor though all different function icons and select them. The icon pointed inverts its colours. If the selected item is a numeric field, the navigation buttons increase/decrease and validate the value.

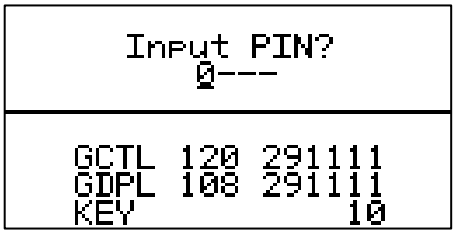
C. *Graphic display & leds:*

It shows alarm messages, operating graphs, function icons and all the information required in freezer-user communication. The colour or each led are:

- Green: Working mode.
- Red: Power fail indicator. Acoustic alarm will be activated.
- Yellow: Alarm mode. Alarm message will appear. And an acoustic alarm is activated together with the yellow light.

Below is an explanation of the different system screens:

1. ***Password Request*** screen *(by default **0000**)*



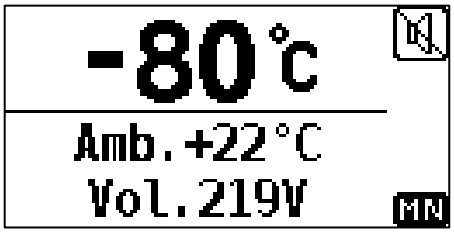
Increases the value of the selected field.

Decreases the value of the selected field.

Confirms the value selected in a field and moves the selection to the next field. After pressing for the final time, if the password is correct, it accesses the *Main Operation* screen.

2. ***Main Operation*** screen.

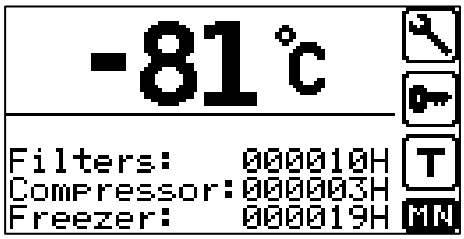
It shows sample temperature, ambient temperature and voltage information. Such information is shown in several screens.



Activates/Deactivates acoustic alarm.

Goes to *Main Control* screen.

3. ***Main Control*** screen.



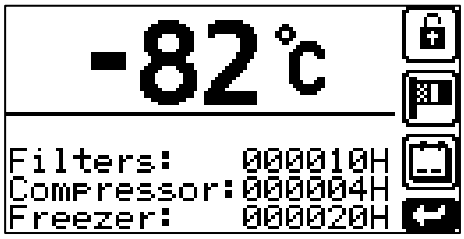
Access to *Adjustments screen.*

Access to *Password Configuration* screen.

. Access to *tests* screen

Goes to *Alarms* screen.

3.1. ***Adjustments*** screen.



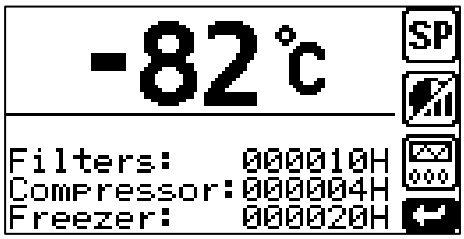
Access to *configuration* screen.

Access to *Language Selection* screen.

Date-hour screen.

Back to *Main Control* screen.

3.1.1. ***Configuration*** screen *(requires pin confirmation).*



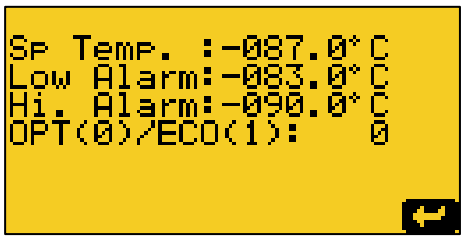
Access to *Set points* screen.

Access to *Contrast & volume* screen.

Access to *Change filter* screen.

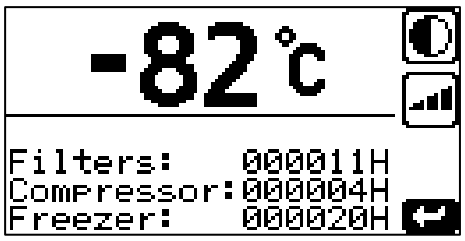
Back to *Adjustments* screen.

3.1.1.1. ***Set points*** screen.



Back to *Configuration* screen.

3.1.1.2. ***Contrast & volume*** screen*.*

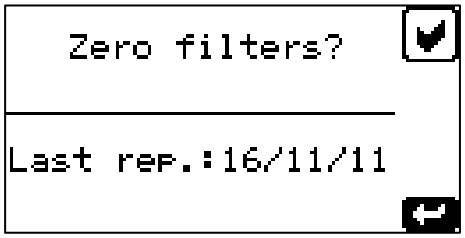


Changes the contrast of the display.

. Changes the volume of the alarms.

Back to *Configuration* screen.

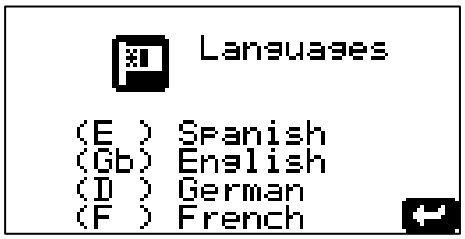
3.1.1.3. ***Change Filter*** screen*.*



Confirms the resets of the hours for the filter.

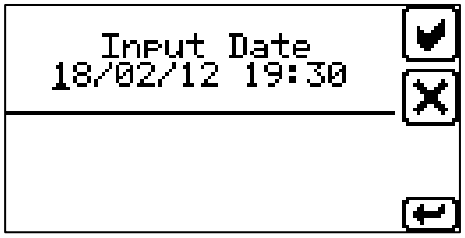
Back to *Configuration* screen.

3.1.2. ***Languages*** screen*.*



Confirms the selected language and goes back to *Adjustments* screen.

3.1.3. ***Date-hour*** screen*.*

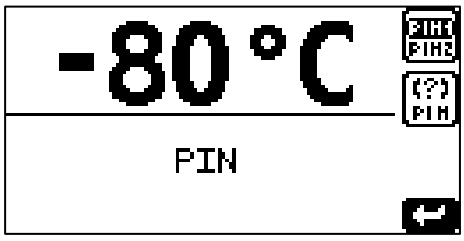


Confirms the selected value and selects next field.
(format dd/mm/yy hh:mm)

Resets numeric fields.

Goes back to A*djustments* screen.

3.2. ***Password Configuration*** screen*.*

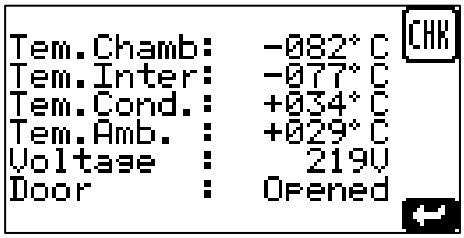


PIN1 PIN2 Enables the user to change the user password.

(?) PIN Coded password. In case of forgotten password, by giving this code to Customer Service the previous password will be recovered.

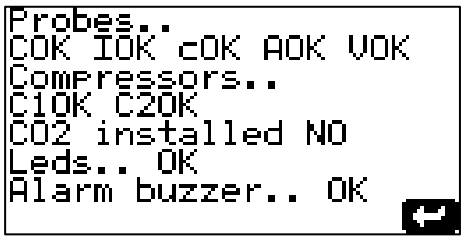
Back to *Main Control* screen.

3.3. ***Tests*** screens*.*



CHK Begins with freezer testing.

Back to *Main Control* screen.



C = Chamber probe

I = Heat Exchanger probe

c = Condenser

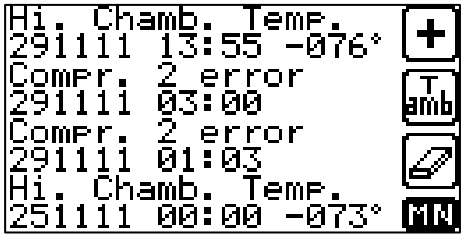
A = Ambient

V = Voltage

C1 = Compressor 1st stage

C2 = compressor 2nd stage

4. ***Alarms*** screen*.*



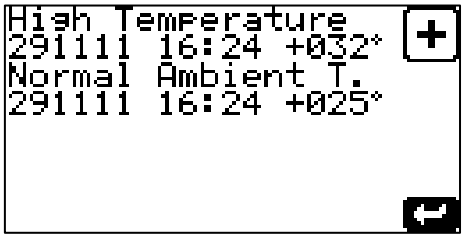
Next page

T amb Access to *Ambient alarms screen*

Access to *Alarm removal* screen

MN Goes to *Info* screen.

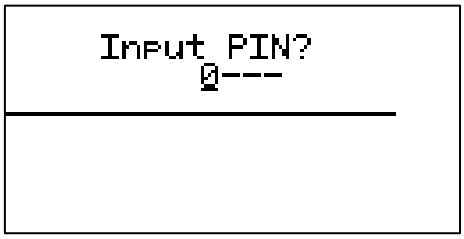
4.1. ***Ambient alarms*** screen*.*



Next page

MN Goes to *Alarms* screen.

4.2. ***Alarm removal*** screen*.*

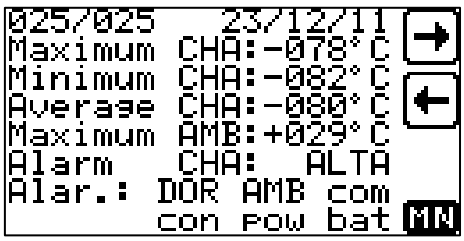


Next page

MN Goes to *Alarms* screen.

5. ***Info*** screen*.*

It shows several data of current day, including the alarm types occurred.



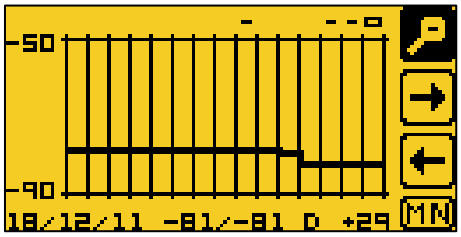
. Next day

Previous day

MN Goes to *Week view* screen.

6. ***Week view*** screen.

It shows chamber temperature graph in a several days view and on bottom, the date, min. / max. T, type of alarm happened in selected date and maximum ambient T value.



Day view

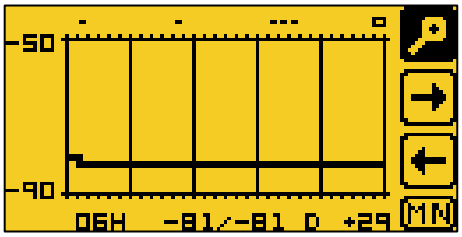
. Next day

Previous day

MN Goes to *Main Operation* screen.

7. ***Day view*** screen.

It shows chamber temperature graph of the current day. It shows on bottom the date, minimum / maximum temperature, type of alarm happened in selected date and maximum ambient temperature value.



Week view

. Next day

Previous day

MN Goes to *Main Operation* screen.

6.2. DISCONNECTION

To stop the ULT, it is necessary to push the On/Off button (Chapter 5.1) to access the *Password Request* screen. After entering the correct password, the ULT will be switched off.

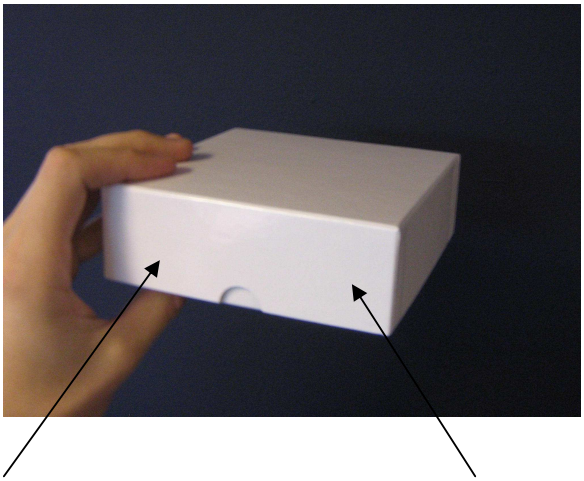
7. ACCESSORIES

7.1. ALUMINUM STORAGE RACKS FOR UPRIGHT FREEZERS

Rack type		Box size	boxes / rack	Fit in freezer model (total)
Side opening		2” / 50mm	**20**	**U445 (15 racks) / U570 (20 racks) / U830 (30 racks)**
		3” / 75mm	**15**	**U445 (15 racks) / U570 (20 racks) / U830 (30 racks)**
		2” / 50mm	**14**	**C370 (20 racks) / C620 (32 racks) / C820 (44 racks)**
		3” / 75mm	**9**	**C370 (20 racks) / C620 (32 racks) / C820 (44 racks)**
Sliding shelves		2” / 50mm	**20**	**U445 (15 racks) / U570 (20 racks) / U830 (30 racks)**
		3” / 75mm	**15**	**U445 (15 racks) / U570 (20 racks) / U830 (30 racks)**

**** all other racks are available on request (micro plate racks, etc)***

7.2. FIBERBOARD STORAGE BOXES AND DIVIDERS



Thick Plastified Card box Material

Easy to remove cover

External Dimensions:

External dimensions of 2 inch boxes (model PP0060): 133x133x49 mm (DxWxH) External dimensions of 3 inch boxes (model PP0061): 133x133x77 mm (DxWxH)

Internal Dimensions:

Internal dimensions of 2 inch boxes (model PP0060): 124x124x45 mm (DxWxH) Internal dimensions of 3 inch boxes (model PP0061): 124x124x70 mm (DxWxH)

Possible dividers:

Dividers are also made of plastified card box. Height of all dividers is 35 mm

Model:	**Description:**
PP1049	Storage box divider 7 x 7
PP1064	Storage box divider 8 x 8
PP1081	Storage box divider 9 x 9
PP1100	Storage box divider 10 x 10

7.3. CO_2 AND LN^2 BACK UP SYSTEM (OPTIONAL)

WARNING

Always use a cylinder which is equipped with siphon tube for withdrawal liquid from the bottom of the cylinder. CO_2 cylinders must be kept at room temperature to function properly. LN_2 bottles are functional at any reasonable temperature.

If a CO2 or a LN2 cylinder falls and a valve is knocked off, the cylinder becomes a deadly missile. Transport the cylinders in a hand truck or cart with secure chain ties for the cylinder. After connection of the cylinder to the system secure the cylinder with chains to a solid object.

The liquids used for these back up systems are non poisonous but very cold and will burn unprotected skin immediately. Wear protective clothing. The gases also distract the oxygen from the surroundings. Do not keep them in enclosed areas.

After closing the valve please check whether the solenoid allows the liquid to bleed off instead of being trapped in the supply tube. If pressure rises too high damage can be inflicted in the unit.

The flow of liquid CO2 and LN2 will be discontinued upon door or lid opening only if the switch provided with the Back up system is installed.

7.3.1. INTRODUCTION OF CO_2 BACK UP SYSTEM (OPTIONAL LC0070)

A CO_2 Backup System ensures an extra safe environment for your samples even in case the Freezer has a long term power failure or in case the freezer has a technical problem. The backup system in combination with a liquid CO_2 bottle / cylinder can remain a temperature around -70°C for several hours.

WARNING

PLEASE DO NOT TURN ON THE CO2 BACK UP SYSTEM FOR THE FRIST TIME BEFORE THE UNIT HAS REACHED THE TEMPERATURE OF -80ºC.

If the CO2 Back up system is turned on before the unit is cold (-80C) the back up system will start injecting CO2 because it has not reached the right temperature yet.

7.3.2. CO_2 BACK UP SYSTEM SAFETY REMARKS

* When you replace the used CO_2 cylinder, please, use the CO_2 cylinder with Siphon Tube, not general CO_2 cylinder;

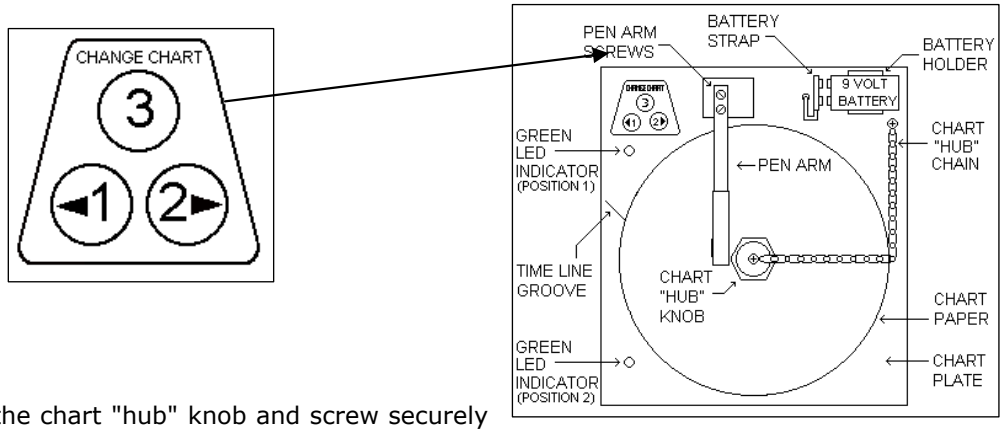
* When the door is open during injection of CO2, the injection should be stopped automatically to protect the user;

*For safety for our **Freezers** we recommend to use our CO_2 backup system always in combination with our pressure equalization valve (PR102) to prevent over-pressure in the cabinet.

7.4. CHART RECORDER (OPTIONAL)

7.4.1. CHANGING THE CHART PAPER

Press and hold the "change chart" button (#3) for approximately one (1) second until the pen begins to move to the left of the chart and then release the button. Wait until the pen has moved completely off of the chart. To remove the chart paper, unscrew (counter-clockwise) the chart "hub" knob at the centre of the chart. Remove the old chart paper and position the new one so that the correct time line coincides with the time line groove on the chart plate. Refer to following figure for the location of the time line groove.

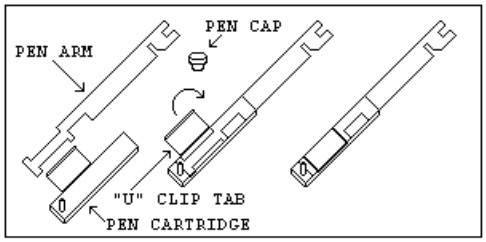


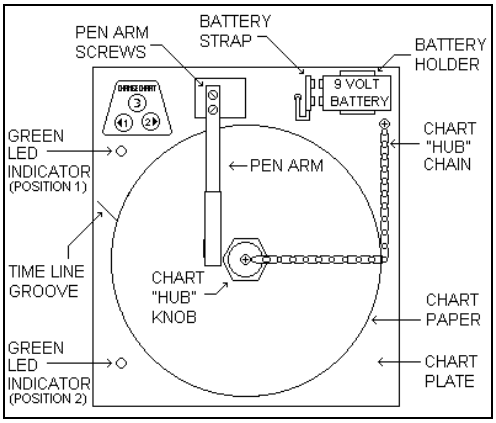
Re-attach the chart "hub" knob and screw securely (by hand) against the chart. Press and hold the "change chart" button (#3) again for approximately one (1) second until the pen begins to move back onto the chart and then release the button. Check to make sure that the pen is marking on the chart paper. If it is not, then carefully adjust the pen arm to establish contact with the paper.

7.4.2. REPLACEMENT OF PEN

Recorders that are equipped with fibre tipped cartridge pens will have a cartridge that is colour coded "red" to designate pen number one (1). The pen cartridge is securely fastened to the metal pen arm using a special "U" clip tab.

For ease of replacement, it is suggested that the two (2) screws that hold the pen arm be loosened and the pen cartridge and metal pen arm be removed as an assembly. Refer to the following figure (next page) for the location of the pen arm screws.





Unsnap the plastic "U" clip tab of the pen cartridge from the metal pen arm, remove and discard the old pen cartridge. Replace the new cartridge by opening the hinge and snapping it securely around the metal pen arm. Refer to the figure above.

7.4.3. PEN ARM CALIBRATION

To check and/or adjust the recording pen calibration to the outer most temperature graduation of the chart, press and hold the "change chart" button (#3) until the pen begins to move off of the chart. Once the pen has moved off of the chart, again press and hold the "change chart" button (#3) until the pen begins to move back onto the chart. The pen should briefly stop at the outer most temperature graduation of the chart before continuing onto the chart to begin recording. If the pen does not stop exactly at this location on the chart, it can be adjusted or "calibrated" by using the left (#1) or right (#2) arrow buttons

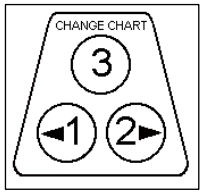
When the pen moves back onto the chart and briefly stops, you will have approximately five (5) seconds in which to adjust the pen's position using the left and right arrow buttons.

Each time the chart paper or fibre tip pen cartridge is changed, you should make sure that each pen stops at the outer most temperature graduation of the chart paper. Otherwise, this pen *offset* will cause the unit to record an incorrect temperature on the chart.

7.4.4. TEMPERATURE RECORDER CALIBRATION CHECK

This recorder has been accurately calibrated at the factory. Before making any adjustments, this instrument should be in service for 24 hours. Thereafter, if any adjustment is required, perform the following procedure:

1. Place a Certified Test Thermometer(s) in a solution bottle(s) alongside the recorder's sensor probe(s).
2. Once the temperature has levelled out, compare the position of the pen on the recorder to the test thermometer's reading.



3. If an adjustment is required, use the left (#1) and right (#2) arrow push buttons on the recorder to calibrate (or move) the pen's position on the chart to correspond to the temperature of the solution. The arrow buttons must be held for approximately five (5) seconds before the pen will begin to move.

7.4.5. BATTERY BACK UP

The green LED light remains a constant green colour indicating that both the battery and the main power to the unit are good. If the AC power were to fail or the battery becomes weak, then the green LED light will begin "flashing" indicating that either you have lost the main power to the unit or it is time to replace the battery. Having a 9 volt DC battery back-up in place, will allow the recorder to continue working normally for approximately 24 hours in the event of a power failure.

7.4.6. BATTERY LOCATION AND REPLACEMENT

To replace the battery, first open the recorder door. The battery will be located in the upper right hand corner of the unit.

Note: Use only NEW 9 volt alkaline replacement batteries.

7.4.7. CHART "RANGE" SELECTION

The recorder that you are using has a *range sticker* (that lists several temperature ranges) mounted on the front of the chart plate.

This recording unit has the option for the user to select from several temperature "ranges" that are programmed into the recorder. **Note:** The chart paper that is used on the recording unit must match the *range* that is selected for the recorder. Otherwise, the pen's position on the chart paper will not correspond to the temperature that is measured.

Also, if the pen moves to the centre or outer edge of the chart and remains there while the unit is powered on, then this maybe an indication that the current range that is selected for the unit is not correct. The recorder has a built-in safety mechanism that will always move the pen to the highest temperature on the chart when the current temperature that is measured is not within the selected range.

This recording unit has five (5) user selectable ranges programmed into the unit. To select from one of the available ranges, follow these instructions:

After the recording unit has been powered-on and is operating normally (recording temperature), press and hold the "change chart" button (#3) until the pen arm begins to move off of the chart. Once the pen has moved off of the chart, press and hold the left arrow (#1) or right arrow (#2) button for approximately five (5) seconds and then release the button.

The green LED light will begin flashing one (1) time if range #1 is selected or will flash two (2) times if range #2 is selected and so on. Press the left arrow button (#1) to increase the range number or press the right arrow button (#2) to decrease the range number that is selected for the recorder. When you have finished selecting the range, press and hold the "change chart" button (#3) until the pen begins to move back onto the chart and the selected range will be saved into the recorder's permanent memory.

Note: The correct range for your purchased ULT is factory set. Changing of chart range is not necessary.

8. SERVICE

8.1. GENERAL TROUBLESHOOTING

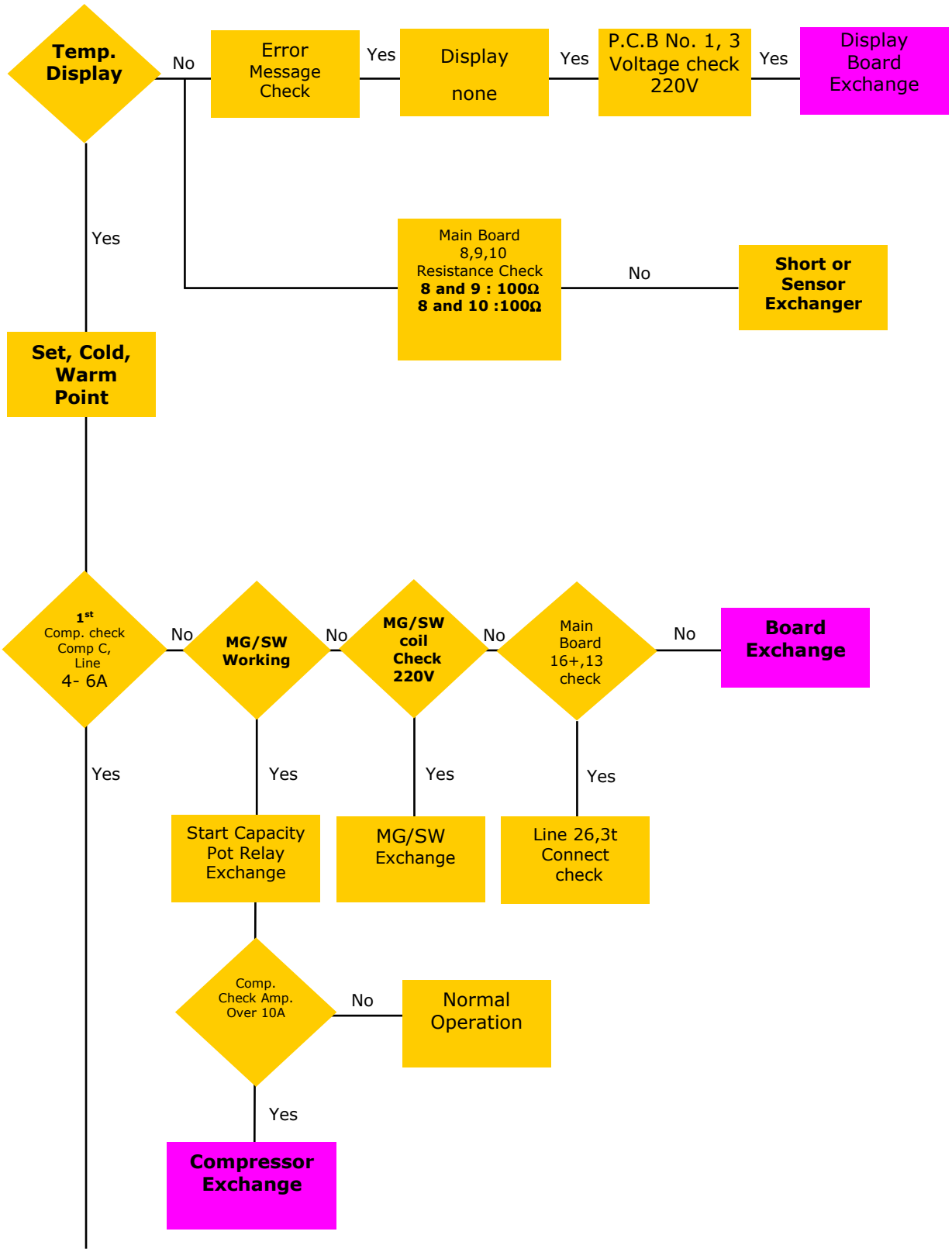
Symptom	Solution
1. When the room temperature is above + 30 °C - In case the room temperature is above + 30 °C for longer time, the condenser cannot be cooled optimal. This can cause high temperature alarm and damage to the compressor system	- If the room temperature around the unit is + 30 °C or warmer, please open the condenser air inlet and make sure that the room is cooled below 30°C . Please note you need an air conditioned room in these circumstances.
2. When the room temperature is below 0 °C - The oil in the compressor will be condensed. It can have negative effect on the operation of the compressor - Some electrical parts will not operate optimal anymore.	- When room temperature is below 0 °C , heat the area/room and keep the temperature minimal + 5 °C
3. In case there is excessive dust around the unit. - This unit uses a condenser which is air cooled. In case of excessive dust around the unit, dust will pile up at the front of the condenser. This will cause the compressor is not cooled effectively and this can cause high temperature alarm and damage to the compressor system	- In case there is excessive dust around the unit open the condenser door once a month and remove and clean dust filter. Also remove dust from the condenser with a soft cloth.
4. In case the condenser door is blocked by an object. - This unit uses a condenser which is air cooled. In case the air circulation / intake is blocked by an object the compressor is not cooled effectively and this can cause high temperature alarm and damage to the compressor system	- Please always make sure the condenser air inlet is kept clear of any object.
5. In case the freezer is installed directly to the wall. - This unit uses a condenser which is air cooled. Warm air should have change to circulate. In case the unit is too close to a wall this freedom is blocked. This will cause the compressor is not cooled effectively and this can cause high temperature alarm and damage to the compressor system	- Please always make sure the freezer is always at least 15 cm free from all sides.
6.Under heavy humid circumstances - It can cause a technical malfunction in the electrical applications and short circuit.	- Ventilate the space properly by using a ventilator or by opening the windows - An application, which can reduce moisture, will be helpful.

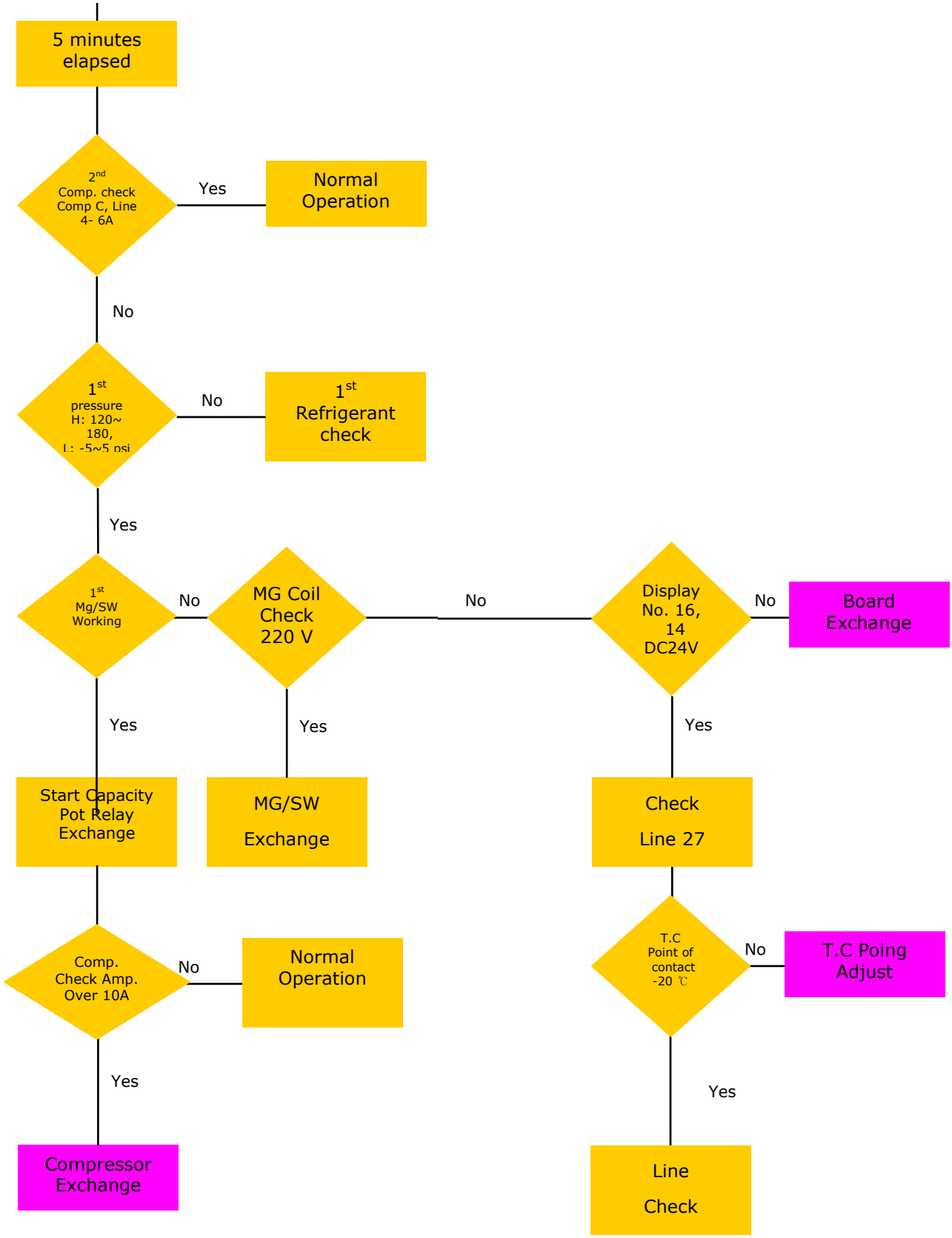
8.2. ELECTRICAL TROUBLE SHOOTING

8.2.1. ERROR CODES

Display Message	Situation
Door Open	The door is open
Low Power	Line voltage is lower than 205 Volts
Power Fail	Failure of the power supply
Low Battery	Battery needs Replacement (part number ……..)
Hi. Cond. Temp.	Temperature of the condenser is over the upper limit (40ºC by default)
Hi. Chamb. Temp.	Temperature of the chamber is over the upper limit
Low Chamber Temp.	Temperature of the chamber is below the lower limit
CO2 Valve	CO2 Valve has been activated
Filter change	The condenser filter is dirty, or the condenser fan is not working properly
Invalid Clock	Time/date should be adjusted
Chamber PTC error	Chamber temperature PT100 has some problem
Heat exch.PTCerror	Heat exchanger temperature PT100 has some problem
Condens. PTC error	Condenser temperature PT100 has some problem
Ambient PTC error	Ambient temperature PT100 has some problem
High Ambient T.	Ambient Temperature is over the upper limit
Compr. 1 error	Temperature PT100 has some problem
Compr. 2 error	Temperature PT100 has some problem
Overheat Compr.	One or both compressors are overheated

8.2.1. ELECTRICAL TROUBLE SHOOTING




5 minutes elapsed
2nd Comp. check Comp C, Line 4- 6A
Yes
Normal Operation
No
1st pressure H: 120~180, L: -5~5 psi
No
1st Refrigerant check
Yes
1st Mg/SW Working
No
MG Coil Check 220 V
No
Display No. 16, 14 DC24V
No
Board Exchange
Yes
Yes
Yes
Start Capacity Pot Relay Exchange
MG/SW Exchange
Check Line 27
Comp. Check Amp. Over 10A
No
Normal Operation
T.C Point of contact -20 ℃
No
T.C Poing Adjust
Yes
Yes
Compressor Exchange
Line Check

8.2.2. ELECTRICAL SCHEMATIC

EQUIPMENT:
Gouda
CHEST and UP RIGHT
PROJECT REFERENCE:
77041
CUSTOMER:
Telstar Technologies
DRAWING TYPE:
ELECTRIC
DRAWINGS:
06
MATERIAL O.F.:

PROJECT LEADER:
Victor Lazaro
AUTOMATION LEADER:
X. Cañellas
DRAWN BY:
X. Cañellas
DATE: 30/09/2011
APPROVED:
X. Cañellas
DATE: 30/09/2011
REVIEWED:
X. Cañellas
DATE: 30/09/2011
AS BUILT:
DATE:

REVISIONS:
ID: DATE: DRAWN BY:
ID: DATE: DRAWN BY:
ID: DATE: DRAWN BY:
ID: DATE: DRAWN BY:
ID: DATE: DRAWN BY:

Date 30/09/2011 Report of Drawings 1004530 Página 1
Gouda
Telstar Technologies

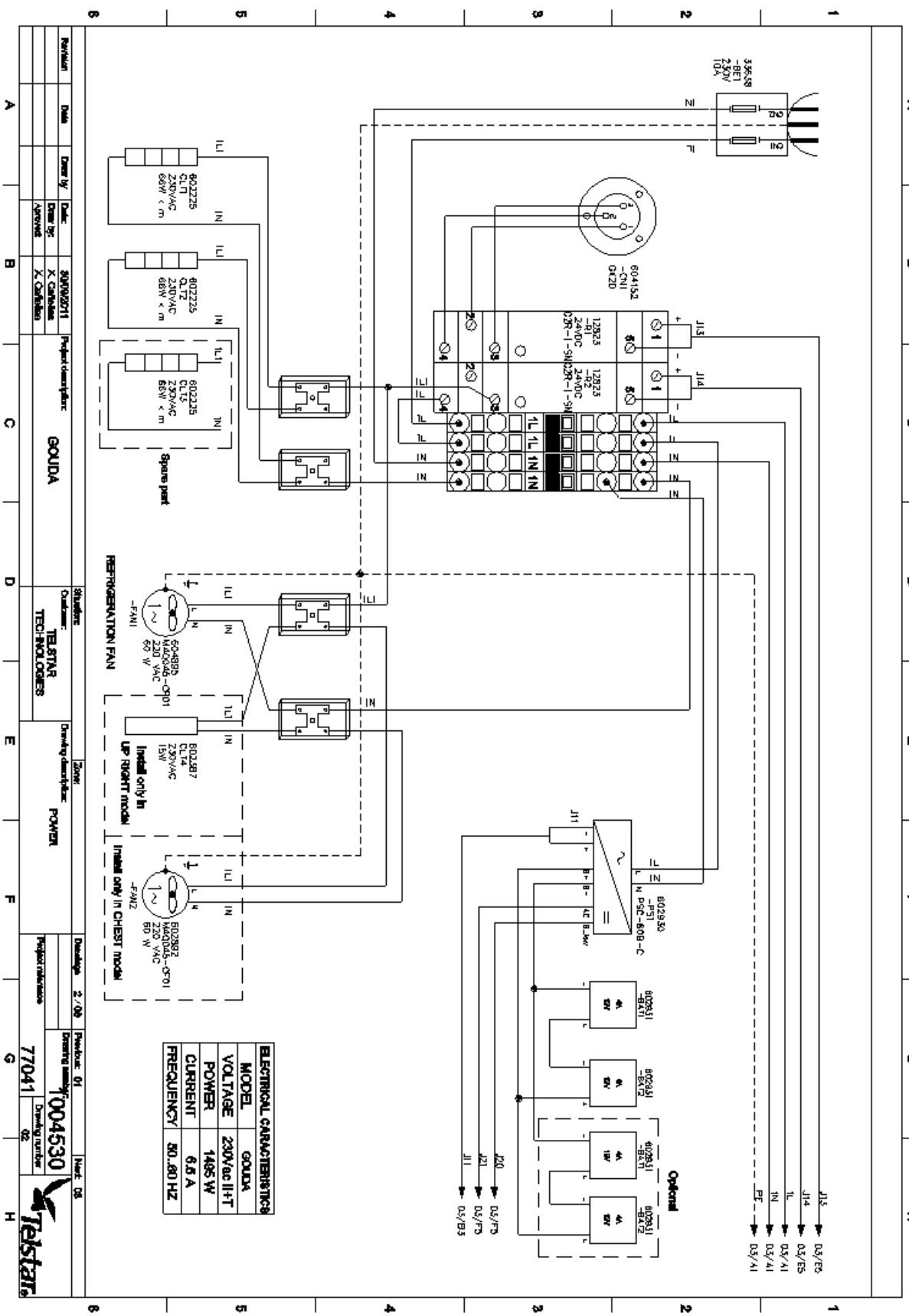
Drawing	Description	Creation	Modification
01	SUMMARY	09/06/2011	30/09/2011
02	POWER	09/06/2011	30/09/2011
03	CONTROL BOARD	09/06/2011	30/09/2011
04	COMPRESSORS	09/06/2011	30/09/2011
05	SENSORS	09/06/2011	30/09/2011
06	BILL OF MATERIALS	09/06/2011	30/09/2011

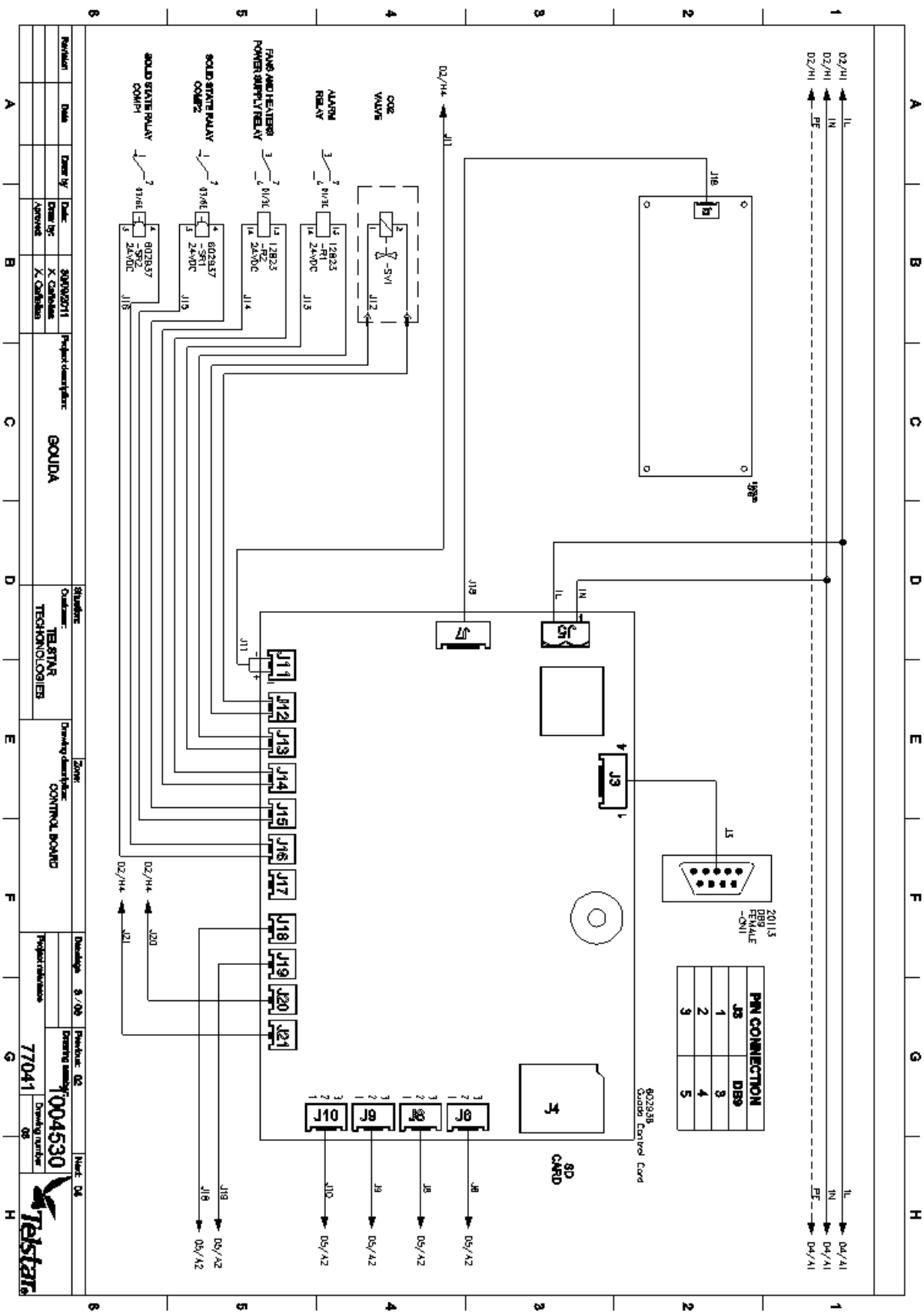
PROPERTY OF TELSTAR
REPRODUCTION FORBIDDEN

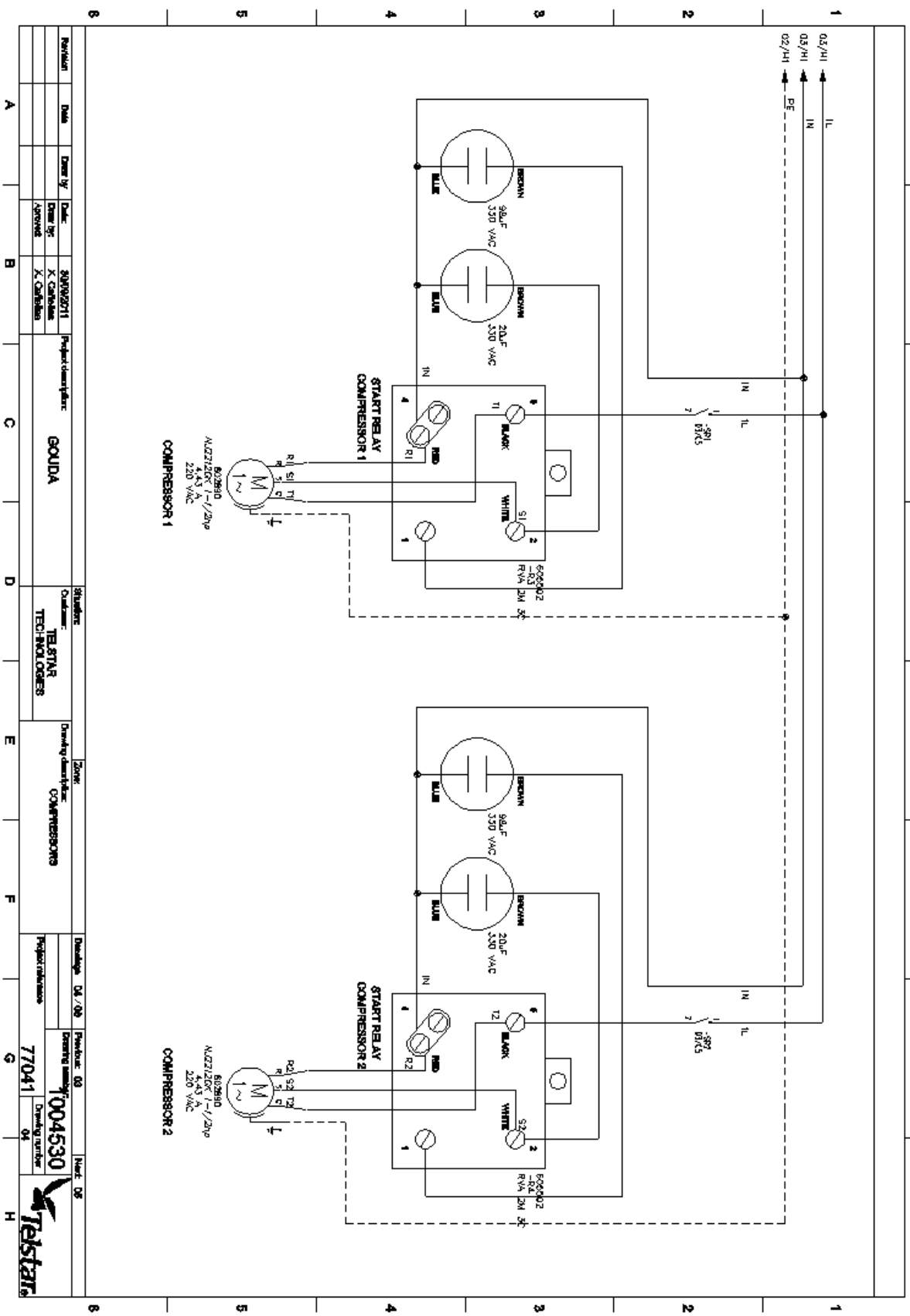
REPLACES:

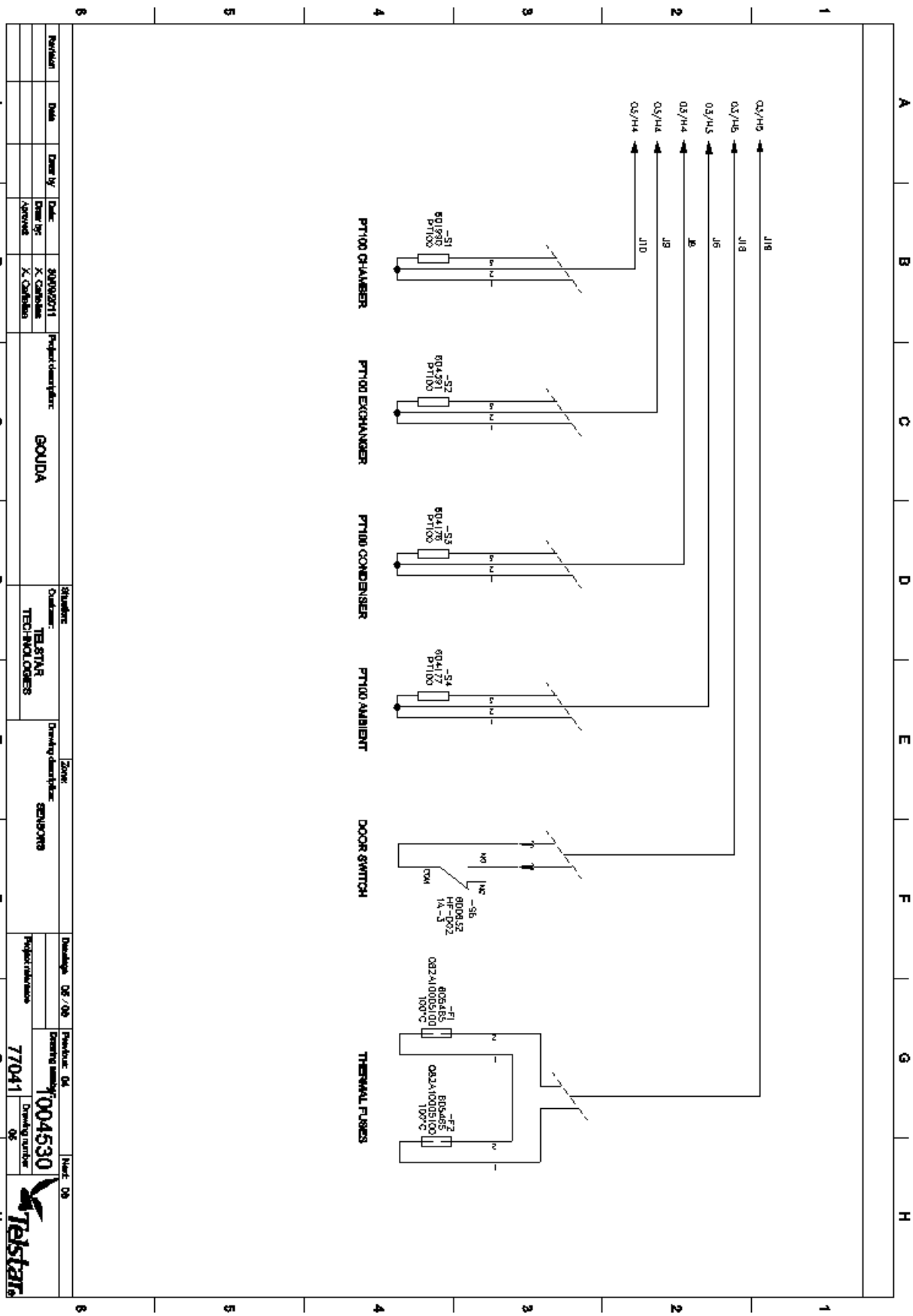
REPLACED BY:

PROJECT NAME:
1004530


GOUDA
POWER
TELSTAR TECHNOLOGIES
77041
1004530
Spare part
REFRIGERATION FAN
Install only in UP RIGHT model
Install only in CHEST model
Optional
ELECTRICAL CARACTERISTICS
MODEL GOUDA
VOLTAGE 230Vac II+T
POWER 1495 W
CURRENT 6.5 A
FREQUENCY 50..60 HZ


GOUDA
TELSTAR TECHNOLOGIES
CONTROL BOARD
77041
1004530
PIN CONNECTION
J5
DB9
1
2
3
4
5
SD CARD
J4
J1
J2
J3
J6
J7
J8
J9
J10
J11
J12
J13
J14
J15
J16
J17
J18
J19
J20
J21
USB
CO2 VALVE
ALARM RELAY
FANS AND HEATERS POWER SUPPLY RELAY
SOLID STATE RELAY COMP2
SOLID STATE RELAY COMP1
D2/H1
D2/H4
D4/A1
D5/A2
IL
IN
PF


L3/H1
L3/H1
L2/H1
PE
IL
IN
98µF
330 VAC
20µF
330 VAC
BROWN
BLUE
START RELAY
COMPRESSOR 1
COMPRESSOR 1
COMPRESSOR 2
START RELAY
COMPRESSOR 2
BLACK
WHITE
RED
T1
S1
R1
T2
S2
R2
-SR1
-SR2
Tel-Star
GOUDA
TEL-STAR
TECHNOLOGIES
COMPRESSORS
77041
1004530
04
06


PT100 CHAMBER
PT100 EVAPORATOR
PT100 CONDENSER
PT100 AMBIENT
DOOR SWITCH
THERMAL FUSES
GOUDA
SENSORS
TELSTAR TECHNOLOGIES
77041
1004530

Date 04/09/2011 Bill of Materials Page 1

GOUDA

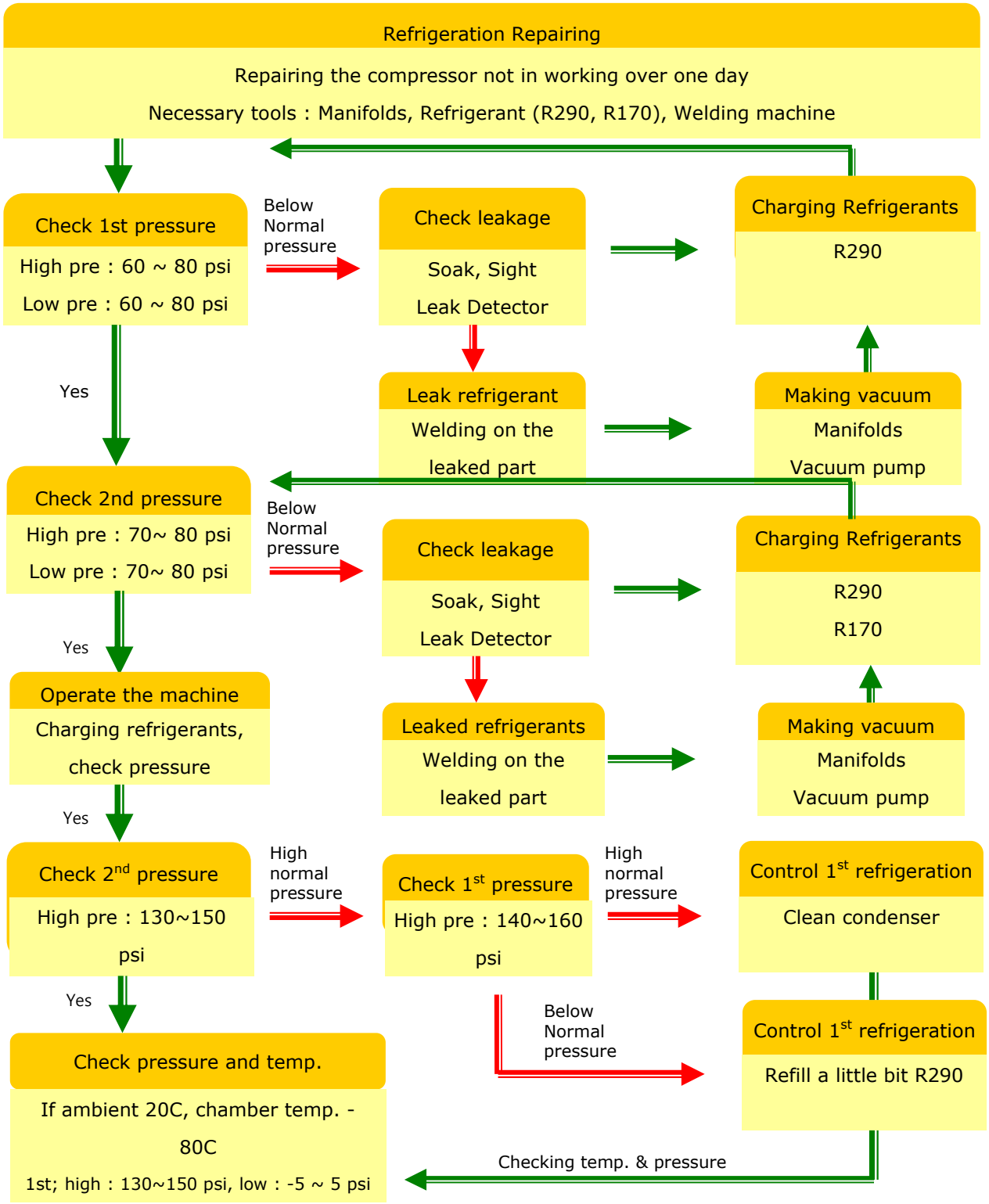
TELSTAR
TECHNOLOGIES, S.L.

Symbol	Drawing	Column	Description	Refer. Numb.	Catalogue	Reference
-BE1	02	A	ELECTRICAL SOCKET 2 FUSES C.HEIL	-	ESPE	33638
-PS1	02	F	Power Supply MEANWELL	PSC-60B-C	ESPE	602930
-BAT1	02	G	12V 4Ah BATTERY	-	ESPE	602931
-BAT2	02	G	12V 4Ah BATTERY	-	ESPE	602931
-R1	02	C	RELAY SPDT G2R-1-SN 24VCC OMRON		ESPE	12823
-R2	02	C	RELAY SPDT G2R-1-SN 24VCC OMRON		ESPE	12823
-FAN1	02	E	REFRIGERATION FAN EBMPAPST	M4Q045-CF01-01	ESPE	604896
-FAN2	02	F	REFRIGERATION FAN EBMPAPST	M4Q045-CA03-51	ESPE	602892
-CLT1	02	B	DOOR HEATER		ESPE	602225
-CLT2	02	B	DOOR HEATER	-	ESPE	602225
-CLT4	02	E	HEATER	-	ESPE	602367
-CARD1	03	D	Control Board GOUDA		ESPE	602956
-DIS1	03	B	DISPLAY MERLIN	-	ESPE	98169
-CN1	03	F	DB9 FEMALE	-	ESPE	20118
-K1	03	B	SOLID STATE RALAY	G3NA-210B	ESPE	602937
-K2	03	B	SOLID STATE RALAY	G3NA-210B	ESPE	602937
-M1	04	C	COMPRESSOR 1		ESPE	602890
-M2	04	C	COMPRESSOR 2	-	ESPE	602890
-R3	04	C	RELAY ELECTRICA RVA 2M 3C		ESPE	605502
-R4	04	G	RELAY ELECTRICA RVA 2M 3C		ESPE	605502
-S1	05	C	PT100 CALIBRATED 1200MM CABLE CONDENSER	PT100	ESPE	604178
-S2	05	D	PT100 CALIBRATED 1300MM CABLE CHAMBER	PT100	ESPE	601990
-S3	05	E	PT100 CALIBRATED 1600MM CABLE AMBIENT	PT100	ESPE	604177
-S4	05	E	PT100 CALIBRATED 1200MM CABLE EXCHANGER	PT100	ESPE	604991
-S5	05	F	MICROSWITCH HF-D02	HF-D02	ESPE	600682
-THF1	05	G	THERMAL FUSE	Q82A10005100	ESPE	605465
-THF2	05	G	THERMAL FUSE	Q82A10005100	ESPE	605465

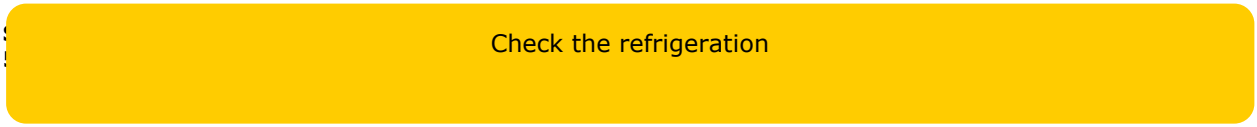
Revision	Date	Drawn by	Date:	04/09/2011	Project description:	Situation:	Zone:	Datalogic 06 / 08	Previous: 05	Next:
			Drawn by:	X. Cañellas	GOUDA	Customer: TELSTAR TECHNOLOGIES	Drawing description: BILL OF MATERIALS		Drawing number: 1004530	
			Aproved:	X. Cañellas				Project reference: 77041	Drawing number: 06	

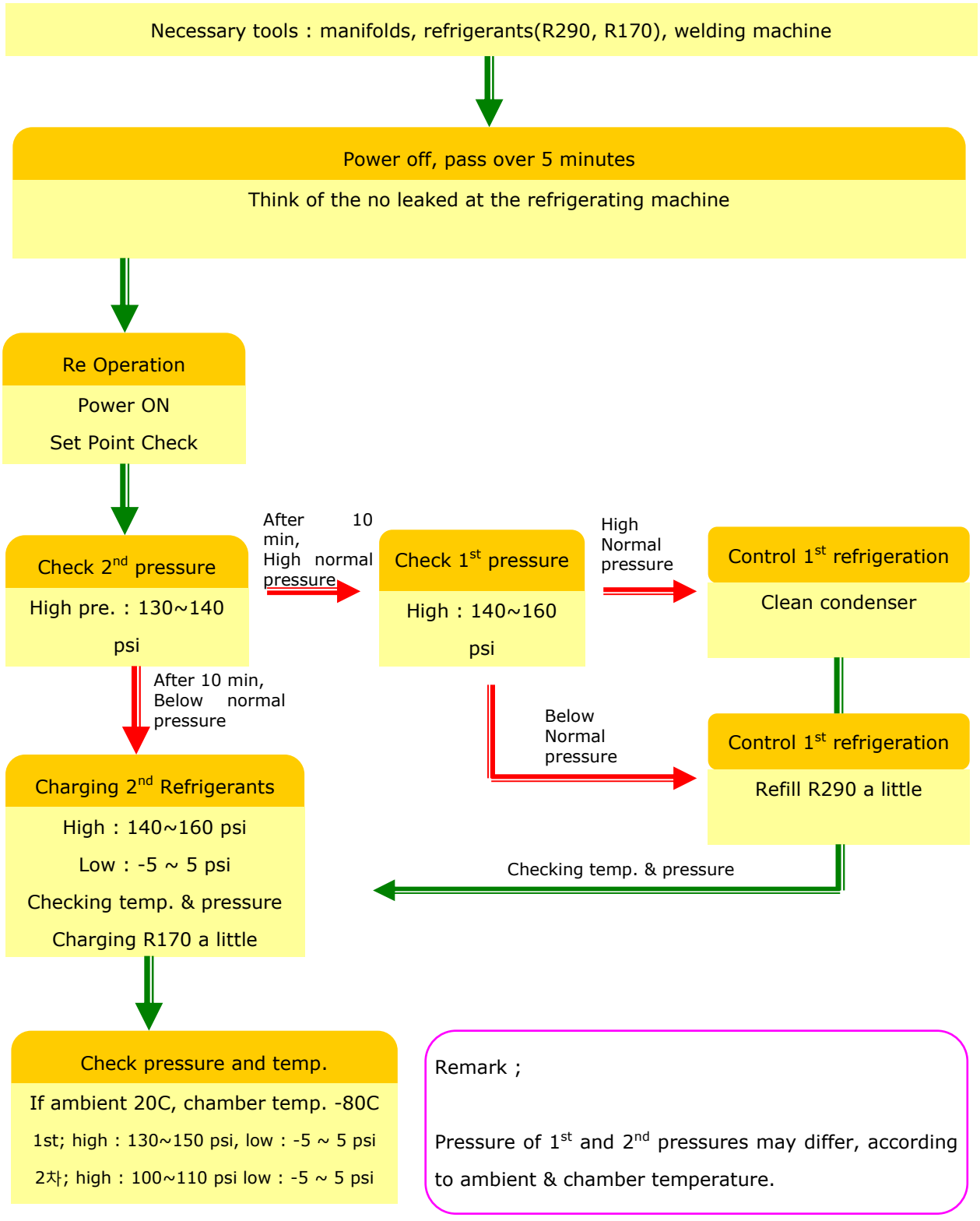
8.3. REFRIGERATION TROUBLE SHOOTING

8.3.1. COMPRESSOR NOT RUNNING



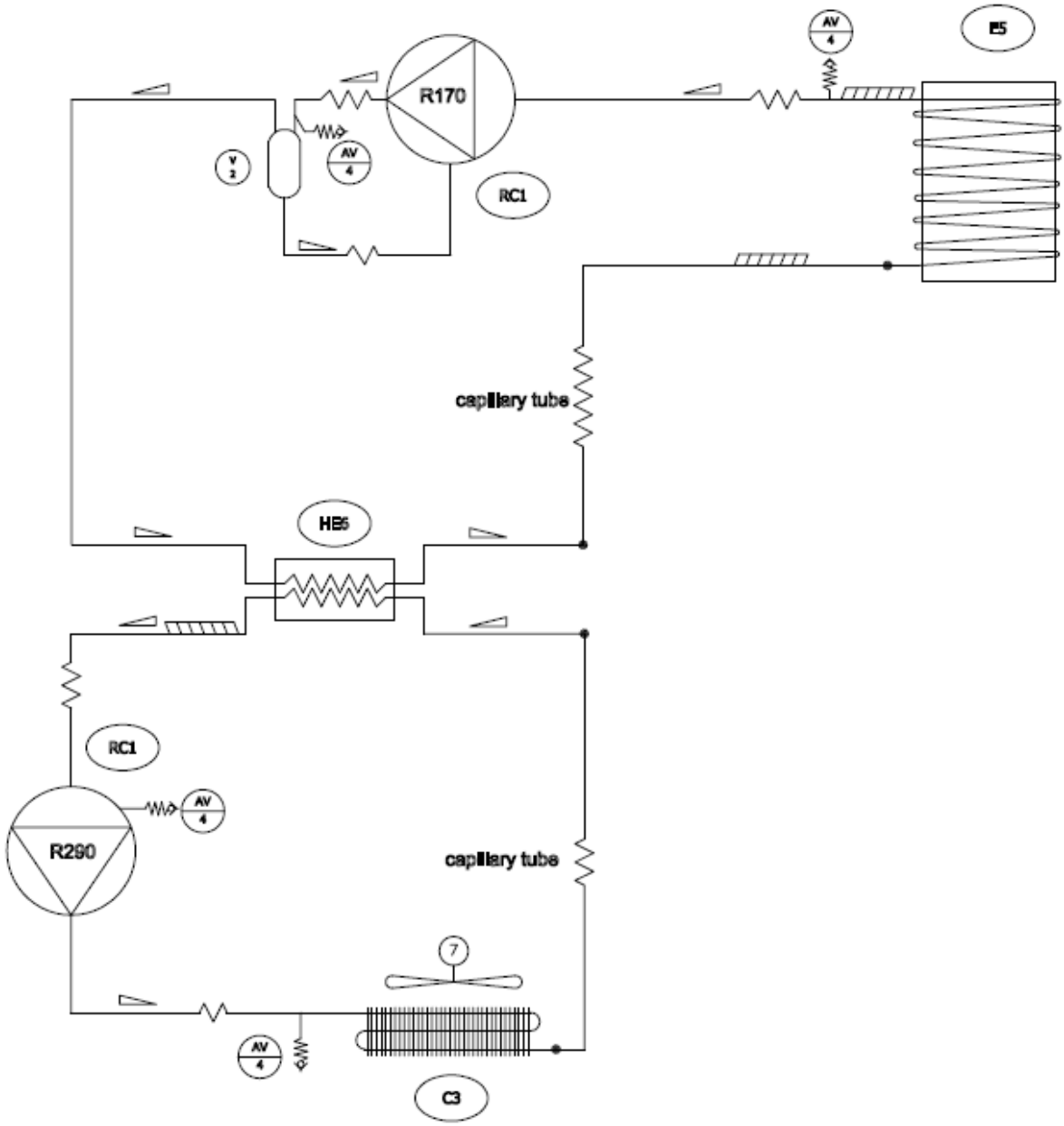
8.3.2. COMPRESSOR IS RUNNING BUT WITH WRONG TEMPERATURE



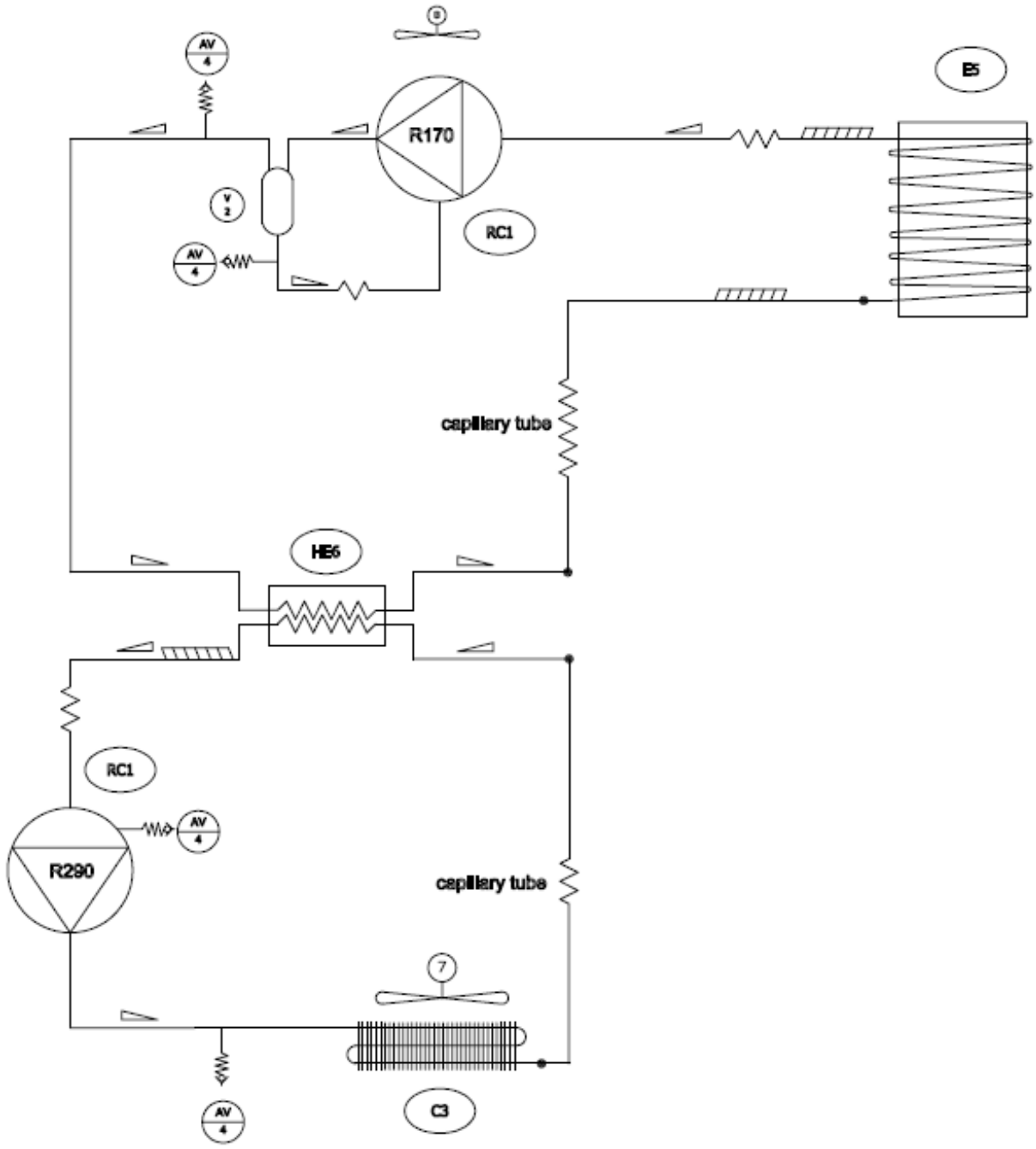

Necessary tools : manifolds, refrigerants(R290, R170), welding machine
Power off, pass over 5 minutes
Think of the no leaked at the refrigerating machine
Re Operation
Power ON
Set Point Check
Check 2nd pressure
High pre. : 130~140 psi
After 10 min, High normal pressure
Check 1st pressure
High : 140~160 psi
High Normal pressure
Control 1st refrigeration
Clean condenser
After 10 min, Below normal pressure
Below Normal pressure
Control 1st refrigeration
Refill R290 a little
Charging 2nd Refrigerants
High : 140~160 psi
Low : -5 ~ 5 psi
Checking temp. & pressure
Charging R170 a little
Checking temp. & pressure
Check pressure and temp.
If ambient 20C, chamber temp. -80C
1st; high : 130~150 psi, low : -5 ~ 5 psi
2차; high : 100~110 psi low : -5 ~ 5 psi
Remark ;
Pressure of 1st and 2nd pressures may differ, according to ambient & chamber temperature.

8.3.3. REFRIGERATION DRAWING AND PRINCIPAL OF THE CASCADE REFRIGERATION SYSTEM

Upright Igloo's:



Chest Igloo's:


AV 4
R170
B5
V 2
AV 4
RC1
capillary tube
HE6
RC1
AV 4
R290
capillary tube
7
AV 4
C3

Principal of Cascade Refrigeration System:

The cascade refrigeration system is designed to use different refrigerants which have different boiling points in one system in order to reach ultra low temperatures (-60ºC down to –150 °C range). Therefore a cascade cooling system needs two separate cooling systems (compressors). Each cooling system (compressor) works simultaneously.

The first stage compressor exists to condense the high pressure line of the second stage compressor. The second stage compressor is the main system which maintains the ultra low temperature of the freezer.

The refrigerant of the first stage compressor is compressed. This compressed refrigerant is cooled by the air cooled condenser. The refrigerant evaporates in the evaporator by a capillary tube (low pressure, low temperature). The heat exchanger is cooled down to less than -40°C. This heat exchanger is now used to condensate the compressed refrigerant coming from the second stage compressor. Because we use a liquid separator, liquid refrigerant is prevented from sucking into the compressor.

The second stage refrigerant is compressed in the second stage compressor. After passing the oil separator, it is condensed in the heat exchanger (cooled to -40°C by the first stage cooling system). The condensed refrigerant goes through the second stage capillary tube. Because of this capillary tube (low temperature, low pressure) it is evaporated in the evaporator and cools the inner chamber to temperatures down to -86°C.

Summary:

- Operation of first compressor
- Cooling of first stage heat exchanger down to -40°C
- Operation of second stage compressor
- Second stage refrigeration is condensing in the heat exchanger of first stage
- Cooling the inner chamber by the second stage refrigeration down to -86°C.

8.3.4. CHARGING QUANTITY AND TYPE OF REFRIGERANTS

8.3.4.1. REFRIGERANT QUANTITY FOR CHEST MODELS (ALL DATA AT +24ºC AMBIENT TEMPERATURES)

Model	The first stage		The second stage		
	Refrigerant	Charging Quantity(g)	Refrigerant	Static Pressure mBar.G	compressors
-86 C370	R-290	150	R-170	5000	2 x 602890, 5/4hp, Hermetic Compressor
-86 C620	R-290	150	R-170	5500	
-86 C820	R-290	150	R-170	6500	

Above tables are for reference only. In case of re-charging please contact your local Scala service engineer

8.3.4.2. *REFRIGERANT QUANTITY FOR UPRIGHT MODELS (ALL DATA AT +24ºC AMBIENT TEMPERATURES)*

Model	The first stage		The second stage		
	Refrigerant	Charging Quantity(g)	Refrigerant	Static Pressure mBar.G	compressors
-86 U445	R-290	150	R-170	6000	2 x 602890, 5/4hp, Hermetic Compressor
-86 U570	R-290	150	R-170	6500	
-86 U830	R-290	150	R-170	8000	

Above tables are for reference only. In case of re-charging please contact your local Scala service engineer

8.4. REGISTRATION OF SERVICE

* Before you register for the service, please read the following information:

1. The unit does not operate at all.

O Please, check the power supply (230V) plug connection.

O Please, check whether the temperature is set in a right way.

O Please, check whether the unit is too close to a heating object.

O Please, check whether the rear side of the unit is too close to the wall.

O Please, check whether the condenser is blocked by dust
(Remedy: wipe off the dust by soft brush)

O Please, check whether a big amount of test sample is inserted within a few hours. (Remedy: this is a temporal phenomenon, please just wait)

2. Loud running noise

O Please, check whether the floor is even.

O Please, check whether the noise is coming from the compressor.

* The noise of the compressor is bigger than that of household refrigerators

O Do you hear a turbo sound?

* This unit is equipped with a fan motor which is used for air cooling system. when the fan motor is running, you can hear some noise.

O Do you hear a knocking sound?

* This sound originates from the parts of the unit, when they are expanded or shrunk.

O Do you hear water stream?

* The unit is equipped with circulation of refrigerant. You can hear the refrigerant stream through the circulation. It is not a technical problem.

3. A layer of ice has formed in the inside wall of the deep freezer

O Put the samples with distances for good ventilation

O If a sample contains much moisture, then put a top on it, or keep it in wrap.

O Please, check whether the door is closed.

O Please, reduce the times to open the door.

9. CONTACT INFORMATION

In case of service or sales back up is needed please do not hesitate to contact your local Dealer.

Scala Scientific

Kryptonstraat
Nr :15
6718 WR

Tel: 0318 642785
Fax: 0318 642706

e-mail**:** info@scala-scientific.nl
http://www.scala-scientific.nl

10. EC DECLARATION OF CONFORMITY

CE DECLARACIÓN DE CONFORMIDAD ***EC DECLARATION OF CONFORMITY***	
Fabricante: *Manufacturer:*	TELSTAR TECHNOLOGIES, S.L. Av. Font i Sagué, 55 08227 Terrassa (Spain)
Descripción: *Description:*	**Congeladores de Ultra Baja Temperatura** ***Ultra Low Temperature Freezers***
Equipos: *Equipments:*	**U830/ U570 / U445 / C820 / C620 / C370** **U830-45/ U570-45 / U445-45 / C820-45 / C620-45 / C370-45**
Archivo del expediente técnico: *Body Retaining Technical File:*	Archivado por TELSTAR TECHNOLOGIES, S.L. *Retained by TELSTAR TECHNOLOGIES, S.L.*
DIRECTIVAS CE: ***EC DIRECTIVES:***	**DECLARACIÓN:** ***DECLARATION:***
Directiva de Máquinas **2006/42/CE** *Machinery Directive* ***2006/42/EC*** Directiva de Compatibilidad Electromagnética **2004/108/CE** *Electromagnetic Compatibility Directive* ***2004/108/EC*** Directiva de Baja Tensión **2006/95/EC** *Low Voltage Directive* ***2006/95/EC*** Directiva Equipos a Presión ***97/23/EC*** *Pressure Equipment Directive* ***97/23/EC*** Equipos de Laboratorio **EN-61010-1** *Laboratory Equipment* **EN-61010-1**	Por la presente, este documento certifica que los equipos arriba especificados cumplen con las normativas y Directivas CE mencionadas, y sus enmiendas. El equipo debe ser instalado, probado y usado estrictamente de acuerdo con las instrucciones de Telstar y usado por personal totalmente capacitado. Para el mantenimiento y reparación solo se deben usar piezas de recambio aprobadas por Telstar, montadas según las instrucciones de Telstar. *This document hereby certifies that the above equipments comply with the standards and EC Directives listed, and their amendments.* *The equipment must be installed, tested and operated in strict accordance with Telstar instructions and used by fully trained operators. Only approved Telstar spares must be used for maintenance and repair and fitted in accordance with Telstar instructions.*
Firmado por: *Signed by:*	Willem van Rheenen
Cargo: *Title:*	Responsable de Telstar Cold Storage *Telstar Cold Storage Manager*
Fecha: *Date:*	Enero 2012 *January 2012*

11. GUARANTEE CERTIFICATE

SCALA TECHNOLOGIES, S.L. guarantees the substitution of all the defect pieces in the period of TWO YEARS, starting in the date of the expedition of the equipment.

This equipment has undergone satisfactorily all the tests and revisions. Therefore, any damage caused by transport, wrong installation or inappropriate use is excluded of this guarantee.

This guarantee does not include any of the fungible materials comprised in the equipment, such as filters, fluids, filaments, etc.

The inappropriate use of the equipment excludes Scala of any responsibility for eventual direct or indirect damages of any nature.

Likewise, this guarantee will be void if pieces other than the ones supplied by SCALA TECHNOLOGIES, S.L. are used for the repairing of the equipment.

NOTE. This guarantee is valid for all the equipment unless otherwise stated. In order to obtain any information about this guarantee, please contact with our Sales Department.